

REMEDIAL INVESTIGATION PROGRAM
FOR
DESA INDUSTRIES
PARK FOREST, IL
PHASE I FINAL REPORT
VOLUME I

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PROJECT NO. 4047RA

EPA Region 5 Records Ctr.



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SECTION 1.0

INTRODUCTION

1.1 ADMINISTRATIVE BACKGROUND

In 1980 the Illinois Environmental Protection Agency (IEPA) and the United States Environmental Protection Agency (USEPA) conducted a joint inspection of the DESA Industries, Park Forest plant. No administrative action was taken as a result of this inspection. We are informed that on October 4, 1982, the IEPA received an anonymous telephone call about conditions at the plant (Complaint C83-70N), specifically, on-site waste disposal.

Responding to this complaint, IEPA personnel met with DESA representatives at the plant on October 18, 1982. At that meeting the IEPA representatives compiled a plant and processes history, surveyed the property briefly, and took seven surface soil samples from various locations around the property. According to the sample identification sheets which accompanied the samples to the IEPA laboratory, the seven samples were taken at spots chosen for their discolored appearance and were designated as follows:

1. "greenish stain" (#01845),
2. "light orangy discoloration" (#01846),
3. "brown gray" (#01844),
4. "dark discoloration" (#01847),
5. "light discoloration" (#01848),
6. "dark soil-petrol odor" (#01849), and
7. "soil with orange bits" (#01850).

The IEPA laboratory was requested to run EP Toxicity tests on these samples for chromium, cadmium, lead, and magnesium. Of

the seven samples, one showed a chromium concentration above the maximum allowable level for waste streams at 40 CFR Part 261.24 (sample #01845 -- identified as hexavalent chromium). A separate sample (#08146) showed cadmium at slightly elevated levels (1.2 mg/l versus the standard of 1.0 mg/l). All readings for lead were well within the EP Toxicity limits. Although magnesium was tested, there are no EP Toxicity levels established for this metal and the results, though seemingly high, were, therefore, inconclusive.

Based upon the findings of elevated metals in samples #01845 and #01846, DESA allowed the IEPA on the property to conduct further tests, samples for which were gathered on August 24 and 25, 1983. Tests were run and results forwarded to IEPA by the laboratory during November, 1983.

The results of these tests indicated the presence of PCB's at three locations, at concentrations of 100, 0.7, and 2600 ppm. Metals tested for, were chromium, lead, cadmium, and magnesium. In this second series of tests, at no sample location did the EP Toxicity metals (chromium, lead, and cadmium) in the soil exceed the waste stream limits at 40 CFR Part 261.24.

Thus, according to the IEPA results from both series of tests, PCB's were found at three locations. However, the more systematic sampling regimen carried out by IEPA in August, 1983, failed to duplicate the 1982 test results with respect to cadmium and chromium, and did not indicate any excessive concentrations of EP Toxicity metals although, once again, elevated levels of magnesium (a non-EP Toxicity metal) were found throughout the area.

Based upon the PCB findings, the State of Illinois, through the Illinois Attorney General's Office, filed a "Notice of Intent to File Suit" on June 1, 1984 under the Toxic Substances Control

Act (TSCA) alleging the "illegal discharge of polychlorinated biphenyls (PCB's) into soil, causing soil and groundwater contamination; that [DESA] failed to properly dispose of PCB's at an incinerator or chemical waste site; and that they failed to clean up said discharge of PCB's."

At a meeting held between plant personnel and the IEPA on August 16, 1984, IEPA indicated that their concerns were: PCB contamination, hexavalent chromium (evidently referring to sample #01845), and other potential wastes.

To address these concerns, DESA (largely through its parent company, AMCA International Corporation) collected resumes during September and October 1984 from a number of environmental engineering firms so that it could choose one to develop its plan to address environmental concerns at the subject site. On November 9 AMCA interviewed Environmental Resources Management-North Central, Inc. (ERM North-Central), retaining them for this purpose as of November 21. Mr. Gerhardt Braeckel, the Assistant Attorney General then assigned to this matter, was informed of the choice of ERM-North Central and requested information about them in December. He was provided this information by Mr. Martin McDermott of the law firm of Ross & Hardies, Chicago attorneys for DESA and AMCA. ERM-North Central submitted its Remedial Investigation Program (RIP) the first week of April, 1985, through an AMCA attorney, Mr. Thomas M. Hoban.

1.2 PROJECT INITIATION AND HISTORY

Upon being retained, ERM-North Central prepared a remedial investigation work plan for the plant, located at 25000 South Western Avenue, Park Forest, Illinois. The overall goal of the ERM-North Central work plan was to conduct those remedial investigations necessary to characterize the site and to ascertain whether the site posed any actual or potential hazard

to the public health and environment. Because the Park Forest plant was not on, or a candidate for, the federal National Priorities List, and taking into account the extent and results of the earlier IEPA testing, ERM-North Central determined that the Park Forest work effort was best approached as a multi-phase project. ERM-North Central then devised Phase I to accomplish the following:

1. Evaluate preliminary data collected by the IEPA which indicated that in some areas the surface soils at the plant might be contaminated with PCB's and metals;
2. Provide a comprehensive analytical program, based on past manufacturing and on-site materials handling practices, which would assist in identifying whether organic and/or inorganic contamination existed in the near surface soils, as well as the general extent and level of such contamination if it were found to be present;
3. Provide a data base that would identify the need for any Phase II work efforts, including the need for ground water investigations.

The evaluation of the preliminary data collected by IEPA posed some difficulties, however, because IEPA records were unclear as to the location of actual sample sites. The second battery of IEPA samples failed to replicate the results of the initial tests. Consequently, it was necessary first to confirm whether or not soil contamination actually existed at the plant and if so, the general areas and level of such contamination. It was also necessary to determine in the event contamination was found to exist, whether the contamination was confined to small,

isolated areas, or whether it was identified with larger areas caused by spills or past disposal practices.

The ERM-North Central work plan designed to accomplish these goals and entitled "Remedial Investigation Program for AMCA International Corporation, Park Forest, Illinois," dated April 4, 1985, was submitted to the Illinois Attorney General's office in April, 1985. Appendix A is a copy of the April 4, 1985, Phase I Work Plan.

1.3 DESCRIPTION OF PLANT PROPERTY

The property in question covers 85.4 acres at 25000 Western Avenue, Park Forest, Illinois, approximately 16 miles south of Chicago. Operations at the plant began in late 1946 or 1947 in two Quonset huts and a maintenance building. Prior to the erection of these buildings, no manufacturing operations are known to have occurred on the property. A thorough examination of available aerial photographs and interviews with employees indicate that prior to 1946 the entire area was farmland.

Figure 1.1 shows the general plant location on the 1973 United States Geological Survey (USGS) 7.5 minute quadrangle map for Steger, Illinois. Figure 1.2 is a topographic map of the property (specially prepared at ERM-North Central's direction for Phase I in 1985 by Chicago Aerial Survey, Des Plaines, Illinois) at a scale of 1 inch equals 100 feet, with 1 foot contours. Figure 1.3 is a Base Drawing of the plant and property, showing identifying features.

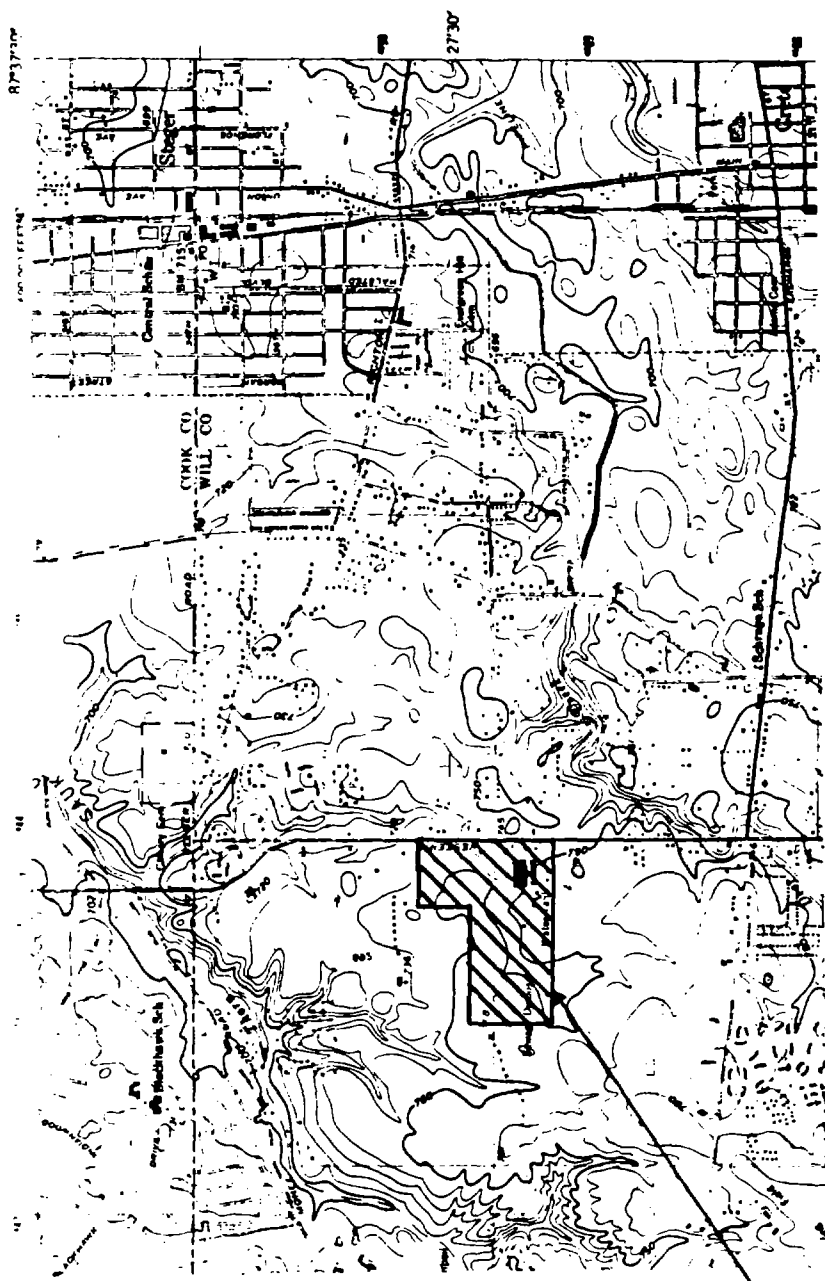
1.4 DESCRIPTION OF MANUFACTURING OPERATIONS

An examination of known records, aerial photographs taken at about 10 year intervals, and interviews with present and former employees all indicate that manufacturing operations were carried

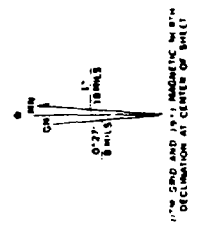
out in the area of the property bounded on the north and south by the fences on the current property, the east by Western Avenue, and to the west by the dirt road just to the east of the concrete pad on which a Quonset Hut (identified in this study as Q5) stood (Figure 1.3). The only known exception to this statement is an Imhoff wastewater treatment plant which was in operation from about 1950 to 1976, at which time the plant tied into the municipal sewer system. There was also a burn area between the Imhoff plant and the plant proper where chips, largely magnesium, were formerly burned. It is believed that these chips came mostly from other plants of the old Mall Tool Company, which were located in Chicago.

The buildings at the Park Forest plant were constructed according to the schedule given in Table 1.1. Figure 1.4 shows the buildings numbered in accordance with Table 1.1. Recent site work has included paving part of the back lot where semi-trailer trucks turn and load, as well as erecting a metal building attachment to Building No. 7.

The basic manufacturing processes used at Park Forest were established by the Mall Tool Company in 1946 and did not change significantly until about 1982. Essentially, the products manufactured at the plant have required the cutting, grinding, degreasing, plating and painting of metal tools and products. A list of the goods manufactured, and the labels under which they were sold, appears in Table 1.2. Under Mall Tool (1945-1956), Remington Arms (1956-1969), and DESA Industries (1969-1985) the product lines were essentially identical. [Although AMCA International Corporation purchased DESA Industries in 1975, the plant continued to be operated under the DESA name and management until 1985]. Recently (since about 1982), the Park Forest plant has been producing powder actuated tools almost exclusively.



APPROXIMATE BOUNDARIES
OF PARK FOREST SITE

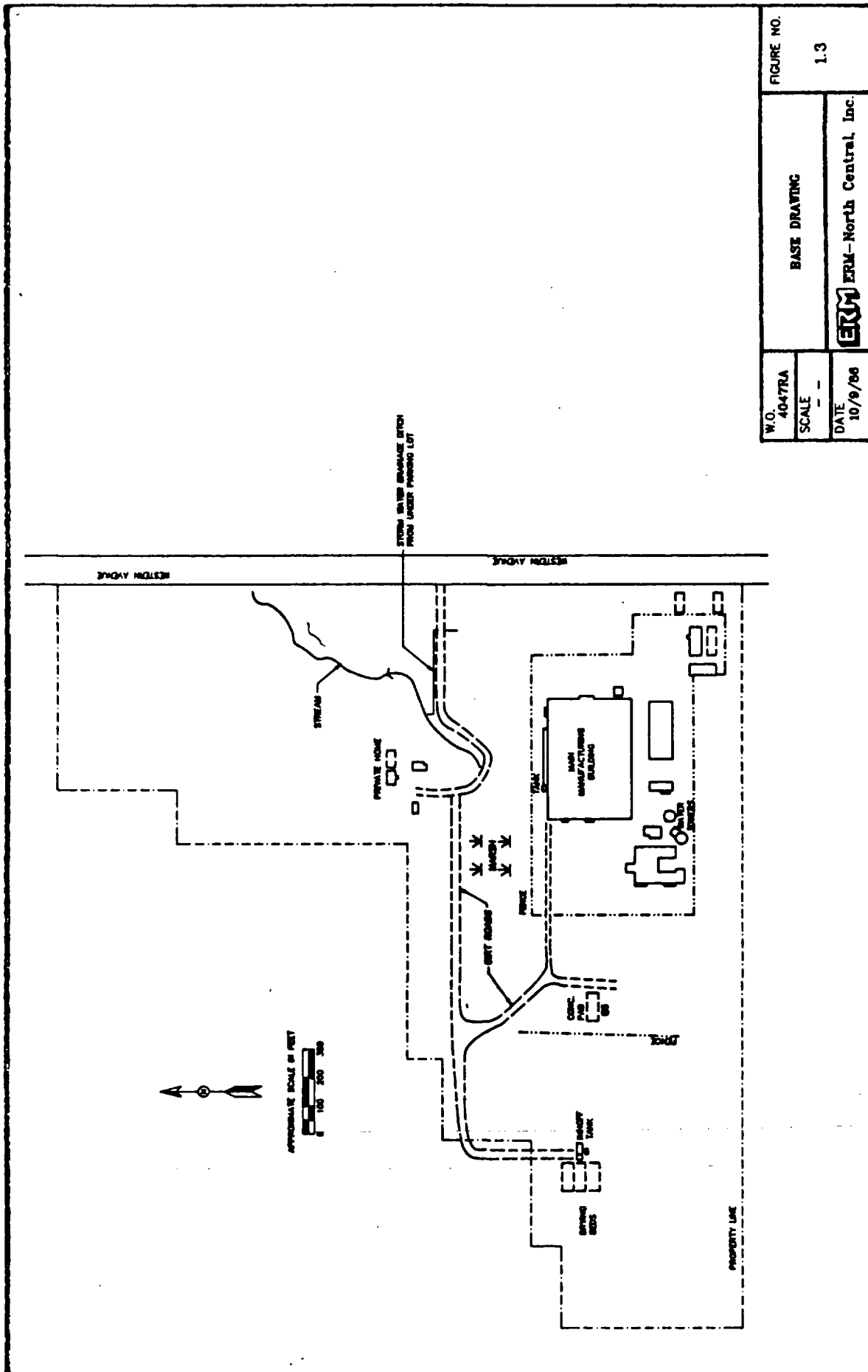


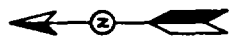
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STEEGER QUADRANGLE
ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC)

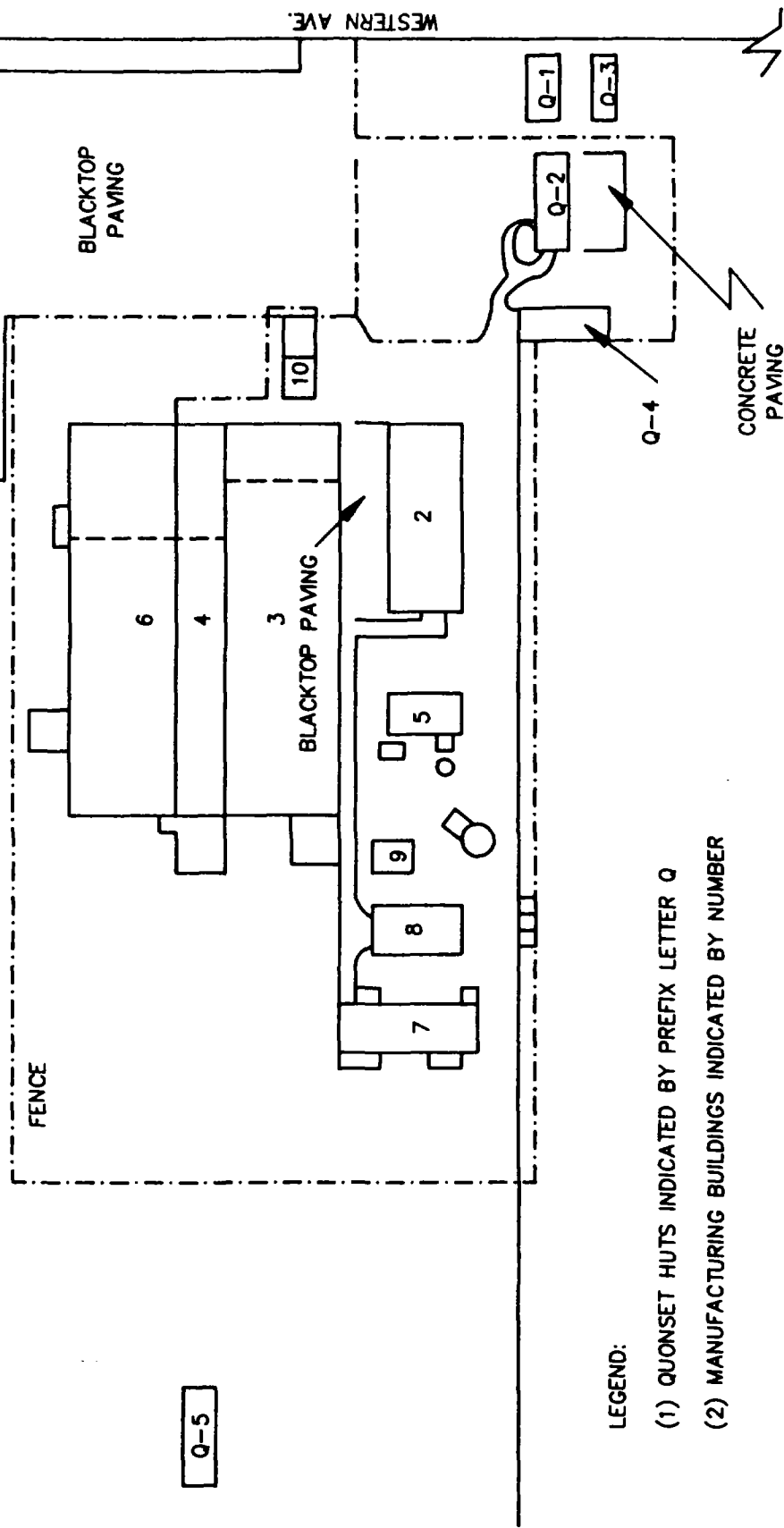
SCALE 1:24000

W.O.	4047RA	FIGURE NO.	1.1
SCALE	—	GENERAL PLANT LOCATION	
DATE	10/18/86	ERM	ERM—North Central, Inc.





Q-5



- LEGEND:
- (1) QUONSET HUTS INDICATED BY PREFIX LETTER Q
 - (2) MANUFACTURING BUILDINGS INDICATED BY NUMBER

DESIGNATION OF PLANT
BUILDINGS

FIGURE

1.4

ERM-North Central, Inc.

TABLE 1.1
LISTING OF PAST AND CURRENT BUILDINGS

	<u>ERECTED</u>	<u>DEMOLISHED</u>
Quonset Huts:		
Q-1	1946	1970 (?)
Q-2	1947 (?)	currently in use
Q-3	1946	1970 (?)
Q-4	1946	currently in use
Q-5	1947 (?)	1970 (?)
Buildings:		
No. 2	1948	currently standing
3	1950	currently standing
4	1957	currently standing
5	1950	currently standing
6	1952	currently standing
7	1957	currently standing
7-A	1984	currently standing
8	1956	currently standing
9	1955	currently standing
10	1951	currently standing

TABLE 1.2

HISTORY OF PLANT PRODUCTS AND LABELS

A. MALL TOOL (1947 - 1956)

(*Items Supplied to Government Were Under Mall Tool Label)

TYPE OF TOOL	LABELS SUPPLIED UNDER		
	MALL	GOV'T(*)	(POW'R KRAFT) WARDS
1. <u>Pneumatic Tools</u>			
Screw Drivers	x		
Circular Saws	x		
Sanders	x		
Impact Wrenches	x		
Vibrators	x	x	
Hand Grinders	x		
Hand Drills (1/4"-3")	x		
Chain Saws (1P & 6P)	x	6P	
2. <u>Electric Tools</u>			
Belt Sanders	x		
Polishers (7" & 9")	x		
Door Planes	x		
Orbit Sander	x		
Circular Saw (6"-9")	x	H-97	7 1/4"
Hand Drills (1/4"-3/4")	x	x	1/4" & 1/2"
Chain Saws (Industrial)	x		
3. <u>Flex-Shaft</u>			
Pedestal Grinders & Motors	x		
Hanger Grinders	x		
Flex-Shaft	x		
Flex-Housing	x		
Concrete Vibrators	x		
Generators	x	B-12	
Angle Spindles	x		
Straight Spindles	x		
Wheel Barrow Mountings	x		
4. <u>Railroad Equip.-Flex-Shaft Driven</u>			
Rail Slotters	x		
Rail Grinders	x		
Rail Drills	x		
Angle Spindles	x		
Straight Spindles	x		

TABLE 1.2
(Continued)

		LABELS SUPPLIED UNDER (POW'R KRAFT)		
		<u>MALL</u>	<u>GOV'T(*)</u>	<u>WARDS</u>
5.	<u>Miscellaneous</u>			
	Gas Chain Saws	x	754	x
	Power Trowels	x		
	Compactors (Asphalt & Dirt)	x		
	Concrete Screeds	x		
B.	REMINGTON ARMS (1956 - 1969)			
	Kept company and "Mall Tool" label as is for two (2) years and then changed their label to "Remington" and altered product lines per the following lists. Note (*) items supplied to government are now under "Remington" label.			
		LABELS SUPPLIED UNDER		
		<u>MALL</u>	<u>GOV'T(*)</u>	<u>BELNAP (BLUEGRASS)</u>
TYPE OF TOOL				
1.	<u>Pneumatic Tools</u>			
	Chain Saws (2P & 6P)	x	6-P	
2.	<u>Electric Tools</u>			
	Chain Saws (Industrial)	x		
3.	<u>Flex-Shaft</u>			
	Pedestal Grinders & Motors	x		
	Hanger Grinders	x		
	Flex-Shaft	x		
	Flex-Housing	x		
	Concrete Vibrators	x		
	Generators	x	B-12	
	Angle Spindles	x		
	Straight Spindles	x		
	Wheel Barrow Mountings	x		
4.	<u>Railroad Equip.-Flex- Shaft Driven</u>			
	Rail Slotters	x		
	Rail Grinders	x		
	Rail Drills	x		
	Angle Spindles	x		
	Straight Spindles	x		

TABLE 1.2
(Continued)

		LABELS SUPPLIED UNDER		
		<u>MALL</u>	<u>GOV'T(*)</u>	<u>BELNAP (BLUEGRASS)</u>
5.	<u>Gas Tools</u>			
	Chain Saws	1-Model	754	x
	Power Trowels	x		
	Compactors (Asphalt & Dirt)	x		
	Concrete Screeds	x		
	Rotor Tiller	x		
	Snow Blower	x		
6.	<u>Powder Actuated Tools</u>			
	Stud Driver (Industrial)	x		
C.	<u>DESA INDUSTRIES (1969 - 1975)</u>			
	Kept Remington label and logo for two (2) years. Then had to drop logo and change "Remington" letter styling while continuing to produce under the "Remington" label. (*) items supplied to government are supplied under the <u>new</u> Remington label.			

		LABELS SUPPLIED UNDER			
		<u>REMINGTON</u>	<u>GOV'T (*)</u>	<u>WARDS</u>	<u>PENNEY'S</u>
TYPE OF TOOL					
1.	<u>Pneumatic Tools</u>				
	Chain Saws (1P & 6P)	x	6P		
2.	<u>Electric Tools</u>				
	Chain Saws (Industrial)	x			
	Chain Saws (Domestic) (A)	x		x	x
(A) Also supplied under the following labels: Granja, Alko, Steinman, Jo-Bo & Nogamatic.					
3.	<u>Flex-Shaft</u>				
	Pedestal Grinders & Motors	x			
	Hanger Grinders	x			
	Flex-Shaft	x			
	Flex-Housing	x			
	Concrete Vibrators	x			
	Generators	x	B-12		
	Angle Spindles	x			
	Straight Spindles	x			
	Wheel Barrow Mountings	x			

TABLE 1.2
(Continued)

		<u>LABELS SUPPLIED UNDER</u>			
		<u>REMINGTON</u>	<u>GOV'T (*)</u>	<u>WARDS</u>	<u>PENNEY'S</u>
4.	<u>Railroad Equip.-Flex-Shaft Driven</u>				
	Rail Slotters	x			
	Rail Grinders	x			
	Rail Drills	x			
	Angle Spindles	x			
	Straight Spindles	x			

		<u>LABELS SUPPLIED UNDER</u>			
		<u>REMINGTON</u>	<u>CHAMPION</u>	<u>DESA</u>	<u>CRAFTSMAN</u>
5.	<u>Gas Tools</u>				
	Power Trowels		x	x	
	Compactors		x	x	
	(Asphalt & Dirt)				
	Concrete Screeds		x	x	
	Concrete Saws		x	x	
	Masonry Saws		x	x	
	Mortar Mixer		x	x	
	Moto-Bugs (Wheel Barrows)		x	x	
	Chain Saws (B)	x	x	x	

(B) Also supplied under the following Labels: Alpina, Castor, Wards, John Deere, Clinton, Nogamatic, Granja, Steinmax and Alko.

6. Powder Actuated Tools
 Stud Driver (Industrial)
 Stud Driver (Domestic) (C)

(C) Also supplied under the "U-Haul" label.

7. Miscellaneous
Log Splitter

- D. DESA/AMCA
 DESA was acquired by AMCA International Corporation in 1975, continuing operations under the name and management of DESA until 1981 when AMCA's Consumer Products Division took over control of the facility under the name Continental/Midland. By that time, mid-1981, most product lines had been discontinued and the number of employees had been reduced to 35.

From that time until the present (1986) the only product line manufactured at the plant has been a line of powder actuated tools sold under the name "Remington."

A list of the manufacturing processes used at the plant has been compiled based upon the records of the products manufactured and interviews with plant personnel and is summarized on Table 1.3.

Since the plant has now had five different owners/operators since operations first started in 1947, very few written records were found. General plant files going back in some, limited, instances to 1975 were located in Quonset Hut Q-2, but were useless for our purposes, being in very poor physical condition and in no particular order. A review of these files has uncovered no information specifically related to waste generation and handling, shipping, or disposal practices. Since 1980, and the effective date of RCRA regulation, manifests for hazardous waste shipments are available.

Because so many of the products produced under different owners involved the same processes, no attempt has been made to distinguish between continuous operations and those which were discontinued briefly but later resumed. No plating or die casting is currently done on the premises (die casting ceased in 1964, electroplating in 1974). According to manufacturing, maintenance, and other personnel, several of whom have been employed at the plant for over 30 years, Table 1.3 includes all processes carried out at Park Forest from 1946 to the present. Table 1.4 is a list of individuals interviewed as part of the investigation conducted to develop a comprehensive history of the plant.

Table 1.5 is a summary table, based on available literature, known shop practices, the recollections of plant personnel, and the experience of ERM-North Central, which identifies the types of wastes and their key contaminants, which can result from the various processes used at the plant.

TABLE 1.3

SUMMARY OF MANUFACTURING PROCESSES

A. Processes with known beginning dates:

Chromium Plating (begun in 1946, ended in 1981)

Magnesium Die Casting (1957, ended in 1964)

Zinc Electroplating (1960, ended in 1974)

Hot Black Oxide (1967)

Cold Black Oxide (1978)

B. Processes continuously carried on or with indeterminate start up/shut down dates:

Copper Plating

General Metal Machining

Magnesium Machining

Heat Treating

Cyanide Pot

Oil Quench

Electric Motor Potting Material

Alkaline Cleaners

Caustic Solutions

Trichloroethylene Vapor Degreasing

Blue Seal Operation

Paint Stripper Tank

Chrome Stripping

Hot and Cold Glue Packaging Systems

Silk Screening

TABLE 1.4

LISTING OF INDIVIDUALS INTERVIEWED AND SOURCES OF INFORMATION

(A) Individuals Interviewed Included:

Harry Stone
James England
Leroy Stege, Maintenance Supervisor
Kenneth Capps
Lawrence Tacchia
Randall Wischover

(B) Other Sources of Information/Data:

1. National Cartographic Information Center
United States Geological Survey
2. Illinois State Water Survey
3. Illinois State Geological Survey
4. U.S. Soil Conservation Service

TABLE 1.5

POSSIBLE WASTES AND CONTAMINANTS

<u>MANUFACTURING PROCESS</u>	<u>POSSIBLE WASTES</u>	<u>POSSIBLE CONTAMINANTS</u>
Chromium Plating	Spent Plating Solutions Sludges Rinse Water Spills	Low pH Chromic Salts Iron Copper Nickel
Magnesium Die Casting	Hydraulic Oils Magnesium Scrap	PCB's Magnesium
Zinc Electro- plating	Spent Baths Rinse Water Spills	Low pH Cyanide Wastes Zinc Salts
Hot Black Oxide and Cold Black Oxide	Caustic Solution Acid Dip Phosphoric Acid	Low pH High pH
Copper Plating	Spent Plating Solutions Rinse Water Spills	Low pH Cyanide Wastes Copper Salts
Cutting Oils Used for Machining	Spills	Oil Chlorinated Solvents Degrading Solvents
Magnesium Machining	Cutting Oils Magnesium Chips	Oil Magnesium Degreasing Solvents
Heating Treating Cyanide Pot Oil Quench	Spills	Cyanide Wastes Oils
Electric Motor Potting Material	Scrap Plastic Enamel	-----
Alkaline Cleaners	Spent Solutions Spills Rinse Water	Suspended Solids High pH Soaps Iron Oils
Caustic Solutions	Spent Solutions Rinse Water Spills	High pH

TABLE 1.5
POSSIBLE WASTES AND CONTAMINANTS
(Continued)

<u>MANUFACTURING PROCESS</u>	<u>POSSIBLE WASTES</u>	<u>POSSIBLE CONTAMINANTS</u>
Trichloroethylene Vapor Degreasing	Rinse Water	Trichloroethylene
Blue Seal Operation	Paint Dipping	Paint Residues
Paint Stripper Tank	Paint Residues Stripper Sludge	Low/High pH Chlorinated Solvents Degreasing Solvents
Chrome Stripping	Liquid Stripper Waste Sludges	Low pH Chromic Salts Nickel
Hot and Cold Glue Packaging Systems	Spills	Glue
Silk Screening	Inks Solvents	Solvents

1.5 TESTING PARAMETERS

As can be seen from Table 1.5, which was used to establish the analytical program used in the Phase I studies, the Park Forest operation was essentially a machine shop. To counter the deficiency in historical data, the testing regimen for this location was expansively designed to test for all of the potential contaminants that could reasonably be expected from the Park Forest manufacturing operations. This analytical program is summarized on Table 1.6.

As shown in Table 1.6, Total Metals rather than the EP Toxicity metals test was chosen as the analytical technique for evaluating metal concentration in the soils. The EP Toxicity test is properly a test for determining whether or not a waste stream is "hazardous" under RCRA and thus is not the correct test for determining the metals concentration in soils. The decision to utilize Total Metals was also dictated by the prior practice of burning magnesium turnings and chips generated from the machining operations. Magnesium is a light, silvery-white and fairly tough metal. It tarnishes slightly in air, and finely divided magnesium (such as turnings and chips) readily ignites (at 500°C) and burns with a dazzling white flame. Once ignited, magnesium fires are almost impossible to extinguish. Because of the intense heat generated by burning magnesium, it is suspected that any other metals present with the wastes that were burned would be found as oxides. Consequently, Total Metal concentrations, which can be compared to background levels, are a much better indicator of metal contamination than are EP Toxicity results. In addition to the Total Metals analyses, Cation Exchange Capacity was also included, as this test provides an accurate guide to the ability of metals to migrate in the soils.

TABLE 1.6

PHASE I ANALYTICAL PROGRAM

SUMMARY OF POSSIBLE CONTAMINANTS*	INCLUDED WITHIN PHASE I ANALYSIS FOR
1. Acid/Caustics & Plating Solutions	1. pH (Soil and Liquids)
2. Chromium, Nickel, Cadmium, Magnesium, Zinc, Lead, Copper & Other Alloy Metals	2. Total Metals
3. Cyanide	3. Total Cyanide
4. Trichlorethylene & Other Degreasing Solvents	4. Priority Pollutant Volatile Organics
5. Cutting Oils, Quench Oils	5. Visual, Odor & Color
6. Die Casting Hydraulic Oils	6. PCB's

*From Table 1.5

The sampling and analytical procedures developed for the Phase I studies were designed to be fully consistent with CERCLA testing and quality control programs.

1.6 IDENTIFICATION OF PHASE I INVESTIGATION AREAS

Interviews conducted with plant personnel also identified on-site disposal practices used prior to 1980 as well as the general location of these on-site disposal areas. Based on this information, on the results of the testing done by IEPA, on several on-site inspections, and on the close examination of aerial photographs taken between 1950 and 1985 (all of which clearly showed consistent use patterns of plant property, including refuse burn piles), the Phase I studies were designed to concentrate on the following areas (Figure 1.5:)

Area A -- The sludge drying beds associated with the long inactive Imhoff tank. Although our investigation showed no reason to suspect contamination here, this area was tested because concern had been expressed by IEPA that process wastewater may have been discharged or dumped into the plant sewer system over the years and been left in the drying beds.

Area B -- A small burn area, located between the Imhoff tank and the concrete pad where Quonset Hut Q-5 was located.

Area C -- An outside temporary drum storage area, located immediately to the east of the Q-5 concrete pad, adjacent to the dirt road.

Area D -- A large burn area located immediately adjacent to the existing rear fence line of the manufacturing area.

Area E -- An area between the dirt road and the rear fence gate which consists of dirt and rubble pushed into that area. Reportedly, the IEPA took several samples from this area, but it is impossible to determine precisely where from the sketch map included with the tests.

Area F -- A second outside drum storage area identified by plant personnel.

Area G -- The area immediately behind Area C and to the north of Area D. On-site inspections identified small mounds of dirt/rubble.

Roadways- The dirt roadway from the "Y" to the north of the Q-5 concrete pad, and going toward the Imhoff Tank as well as the juncture with the private home access road. Visual inspections of this roadway identified scrap metal parts and other materials.

SECTION 2.0

PHASE I EVALUATION REPORT

2.1 INTRODUCTION: PURPOSE OF PHASE I

The Phase I field sampling effort was initiated during the week of June 17, 1985. As explained above, this work effort was established as a screening approach to:

1. Evaluate preliminary data collected by the IEPA which indicated that in some locations, the surface soils at the plant might be contaminated with PCB's and metals;
2. Provide a comprehensive analytical program, based on past manufacturing and on-site materials handling practices, which would assist in determining whether organic and/or inorganic contamination existed in the near surface soils, as well as the general extent and degree of such contamination if it were found to be present;
3. Provide a data base that would identify the need for any Phase II work efforts, including the need for ground water investigations.

2.2 PHASE I INVESTIGATIVE APPROACH

2.2.1 Information Sources

As part of the Phase I studies, a thorough review was made of the site topography and drainage, plant sewer drawings, sources of water, points of storm and process discharges and other possible sources of releases, and any possible pathways, to insure that the Phase I screening was all-inclusive. In addition, numerous other sources of information and data were reviewed relative to obtaining a complete historic summary of on-site activities. Included in this investigation were:

- o Review of IEPA testing areas. When IEPA representatives collected their samples, they provided a sketch map with approximate sample locations. The Phase I studies encompassed the IEPA sample locations to the extent possible, so as to screen the same areas as had IEPA.
- o Interviews with plant employees and review of available plant operating records.
- o Review of aerial photographs from the National Cartographic Information Center, United States Geological Survey, for the years 1952, 1954, 1961, 1967, 1970, 1973, 1974 and 1983. Also reviewed were aerial photographs made for the topographic mapping done in 1985 as part of Phase I itself. These provided the most recent set of aerial photographs.

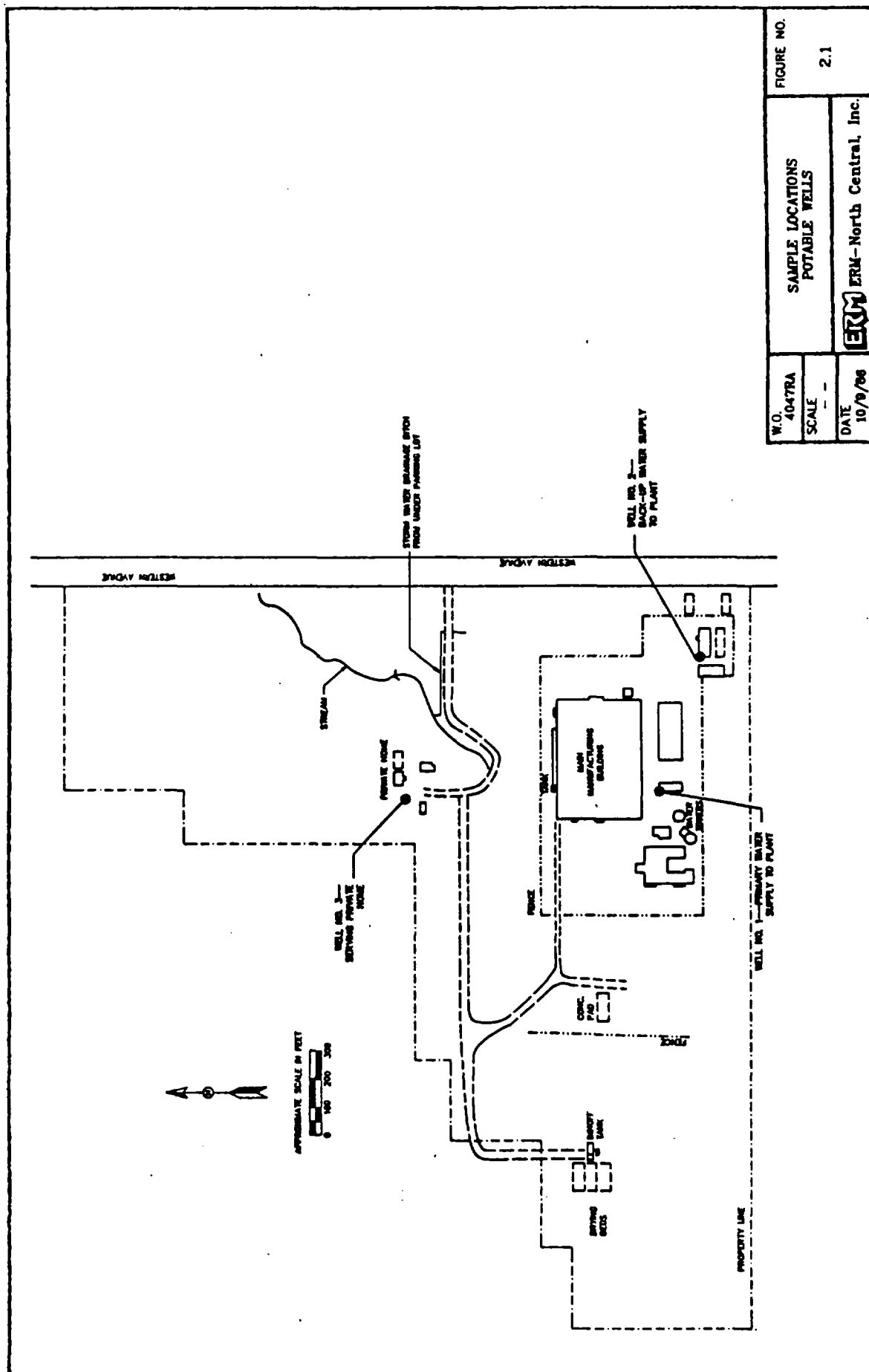
- o Review of copies of all well logs within the general area of the plant site from the Illinois State Water Survey.
- o Review of the U.S. Soil Conservation Service and the Illinois State Geological Survey.

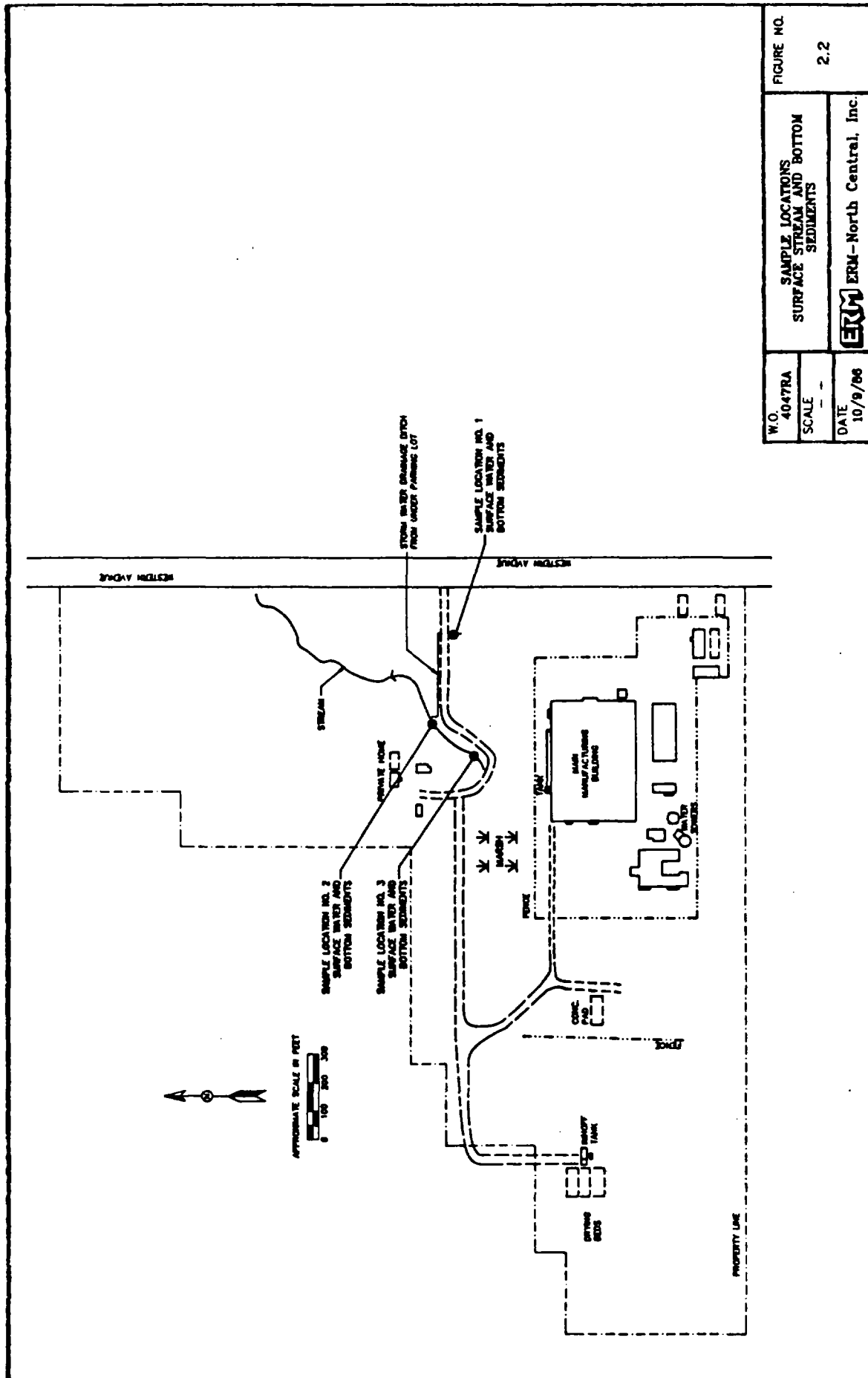
The information gathered from the above sources was carefully reviewed and used to develop a complete and efficient approach for designing the final Phase I field sampling efforts.

2.2.2 Control Of Testing Areas

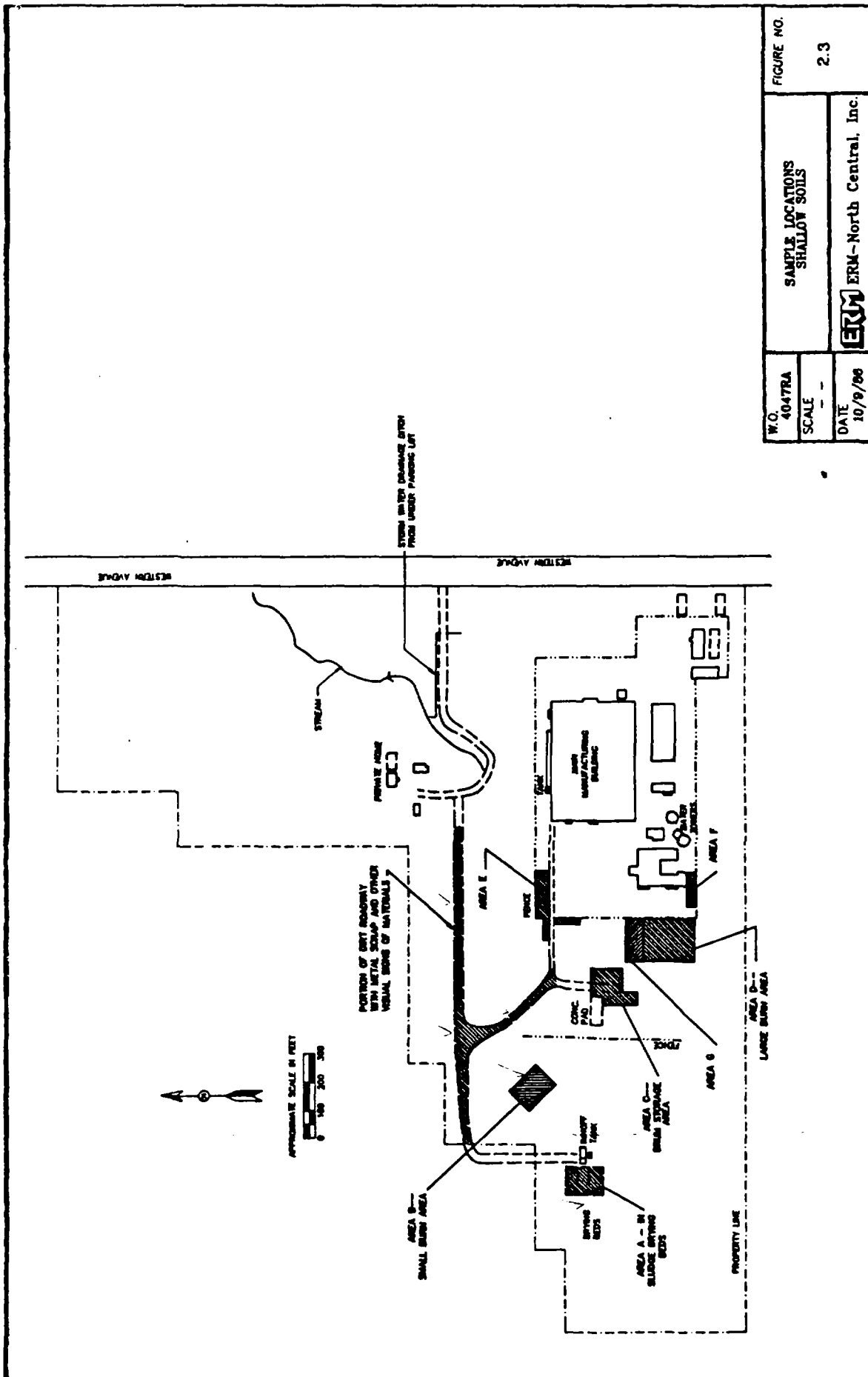
Field activities were purposely designed and directed to encompass those areas indicated by historical data, by aerial photographs, and by IEPA tests to be the areas likely to be contaminated, and to further ensure that a comprehensive sampling effort was conducted. The June 17 sampling program thus included the following:

- o The two on-site deep wells that provide potable and process water to the plant (Figure 2.1).
- o The well serving the rental home located on the property (Figure 2.1).
- o Both surface water and bottom sediments along the unnamed stream which flows from the marshy area located to the north of the main plant building. This includes the surface water and bottom sediments from the main plant storm water discharge which empties into a drainage ditch just north of the main parking lot (Figure 2.2).





W.O. 4047RA	SAMPLE LOCATIONS SURFACE STREAM AND BOTTOM SEDIMENTS		FIGURE NO.
SCALE -			2.2
DATE 10/9/06	ERM - North Central, Inc.		



- o Surface soil sampling, compositing and analytical screening of soils to a depth of four feet in those areas where on-site disposal and drum storage are believed to have occurred (Figure 2.3).
- o The dirt roadway behind the plant proper which provides access to the Imhoff tank (Figure 2.3).

2.2.3 Compositing

It was further decided to collect composite soil samples during the Phase I shallow soil sampling program. Compositing of soil samples is both accepted and customary in reconnaissance surveys and was chosen as the method to follow in order to: 1) control analytical costs within the context of a Phase I screening approach where prior IEPA test results indicated that no significant metals contamination was present, and 2) allow for a more extensive screening of relatively large areas as a precursor to more detailed Phase II studies, if such studies were found to be necessary.

2.2.4 Water Monitoring

Ground water investigations were not initiated during the Phase I efforts because the extent and/or level of soil contamination had yet to be ascertained. (The only IEPA tests indicating metals contamination were surface scrapings.) If the soils test indicate that groundwater investigations are necessary, they would be better directed, and more efficiently done as part of Phase II, because a reasonable data base comprised of the metals known to be on site is established.

Additionally, storm water and process wastewater discharges that have a valid State permit or are directed to the City of Park Forest were not sampled. The sampling/analytical requirements for these discharges were reviewed however, and no concerns or problems with such discharges were noted.

As previously discussed, most field sampling was conducted during the week of June 17, 1985. Preliminary sampling of the plant potable water supply wells however, was conducted during January, 1985, to confirm that the plant's drinking water was not contaminated and was therefore safe for employee consumption. Sample collection procedures and protocols used during this January sampling were as specified in the work plan included in Appendix A. Samples were shipped by over-night air express to Rocky Mountain Analytical Laboratory, Arvada, CO, for analysis. The complete laboratory report, including chain-of-custody records, and the laboratory quality control summary is included as Appendix B. The water was found to be uncontaminated.

2.2.5 Ambient Air Monitoring

As specified in the Phase I work plan, ambient air monitoring using an American Gas and Chemical Company, Model 501, Organic Vapor Analyzer (OVA) was conducted around, and during, the shallow soil sampling. Additionally, the plant perimeter was walked daily during all other on-site field sampling activities, to determine if any unusual readings were detected. The Model 501 was set to sound an alarm were any reading to exceed four parts per million (ppm) above the background reading. Throughout the sampling and perimeter screening, the background was found to be zero, and the OVA alarm never sounded, indicating no significant organic escape.

2.2.6 Underground Tanks

The Phase I work plan also specified that the existing underground storage tanks, located immediately to the south of the boiler house (Building 5), were to be leak tested. Prior to the initiation of the June 17 field effort, however, plant management informed ERM-North Central that the underground tanks were scheduled to be removed in 1987. Consequently, since excavation and removal of these tanks would allow direct access to the tank pit and soils, the tank leak testing was postponed.

There is no indication of leaks at the moment and when the tanks are removed, visual inspection and soil testing is planned to document that no significant releases have occurred. In the interim, a monitoring well has been requested by the IEPA in the underground tank farm area; this monitoring well will be included as part of the proposed Phase II activities (See Figure 3.3).

The remainder of Section 2.0 discusses, in overview, the sampling and compositing procedures, and the analytical results from each of the areas sampled in Phase I.

2.3 RESULTS OF PHASE I SAMPLING: SPECIFIC AREAS

2.3.1. ON-SITE DEEP WELLS

2.3.1.1 Site Geologic Setting

The stratigraphic column for the general Chicago area is shown on Figure 2.4. An expanded Quaternary stratigraphic column is shown on Figure 2.5. The uppermost bedrock unit at the site is believed to be Silurian Niagaran dolomites. These dolomites are overlain by approximately 100 to 150 feet of Valparaiso drift (Willman, 1971). There are no well logs available for the

Time Stratig			Rock Stratigraphy		GRAPHIC COLUMN	Thickness (Feet)	KINDS OF ROCK
SYSTEM	SERIES	STAGE	MEGA-GROUP	GROUP			
QUAT.	PLEIS.				(See fig 15)	0-350	Till, sand, gravel, silt, clay, peat, marl, loess
PENN.	DESM.			Kewanee	Carbondale	0-125	Shale, sandstone, thin limestone, coal
					Spoon	50-75	As above, but below No 2 Coal
MISS.	VAL.				Burl-Keokuk	0-700	Limestone
	KIND				Hannibal		Only in Des Moines Disturbance
DEV.	UP.				Grossy Creek	0-5	Shale in solution cavities in Silurian
SILURIAN	ALEX.	NIAGARAN	Huron		Racine	0-300	Dolomite, pure in reefs; mostly silty, argillaceous, cherty between reefs
					Waukesha	0-30	Dolomite, even bedded, slightly silty
					Joliet	40-60	Dolomite, shaly and red at base; white, silty, cherty above, pure at top
					Kankakee	20-45	Dolomite; thin beds; green shale partings
					Edgewood	0-100	Dolomite, cherty, shaly at base where thick
	CIN.	RICH.	Maquoketa		Neda	0-15	Oolite and shale, red
					Brainerd	0-100	Shale, dolomitic, greenish gray
					Fl Atkinson	5-50	Dolomite, green shale, coarse limestone
					Scales	90-120	Shale, dolomitic, gray, brown, black
					Wise Lake		Dolomite, buff, pure
ORDOVICIAN	CHAMPLAINIAN	TRENT.	Ottawa		Dunleith	170-210	Dolomite, pure to slightly shaly; locally limestone
					Gullenberg	0-15	Dolomite, red specks and shale partings
					Nachusa	0-50	Dolomite and limestone, pure, massive
					Grand Detour	20-40	Dolomite and limestone, medium beds
					Mifflin	20-50	Dolomite and limestone, shaly, thin beds
	CANADIAN		Knox		Pecatonica	20-50	Dolomite, pure, thick beds
					Glenwood	0-80	Sandstone and dolomite, silty; green shale
					Ancell		
					St Peter	100-600	Sandstone, medium and fine grained; well rounded grains; chert rubble at base
					Shakopee	0-70	Dolomite, sandy, oolitic chert; algal mounds
CAMBRIAN	CROIXAN	TREMP.			New Richmond	0-35	Sandstone, fine to coarse
					Oneate	190-250	Dolomite, pure, coarse grained; oolitic chert
					Gunter	0-15	Sandstone, dolomitic
					Eminence	50-150	Dolomite, sandy
					Potosi	90-220	Dolomite; drusy quartz in vugs
	DRESBACHIAN	FRAN.			Franconia	50-200	Sandstone, glauconitic, dolomite, shale
					Ironton	80-130	Sandstone, partly dolomitic, medium grained
					Galesville	10-100	Sandstone, fine grained
					Eau Claire	370-570	Siltstone, dolomite, sandstone and shale, glauconitic
					Mt Simon	1200-2900	Sandstone, fine to coarse; quartz pebbles in some beds
PRE-CAM.							Granite

SITE AREA
STRATIGRAPHIC COLUMN

FIGURE

2.4

ERM ERM-North Central, Inc.

FROM WILLMAN, 1971

TIME STRATIGRAPHY				ROCK STRATIGRAPHY				MORPHOSTRATIGRAPHY
SYSTEM	SERIES	STAGE	SUBSTAGE					
QUATERNARY	PLEISTOCENE	HOLOCENE						Lake Border Drifts
								Zion City Drift
		WISCONSINAN	VALDERAN					Highland Park D.
			TWO-CREEKAN					Blodgett D.
			WOOD-FORDIAN					Deerfield D.
						Park Ridge D.		
						Tinley D.		
						Valparaiso Drifts		
						Palatine D.		
						Clarendon D.		
						Roselle D.		
						Westmont D.		
						Keeneyville D.		
						Wheaton D.		
						West Chicago D.		
						Valparaiso Drifts		
						Fox Lake D.		
						Cory D.		
						West Chicago D.		
						Manhattan D.		
						Wilton Center D.		
						Rockdale D.		
						St. Anne D.		
						Minooka D.		
						Marseilles D.		
						St. Charles D.		
						Berlino D.		
						Huntley D.		
						Gilberts D.		
						Elburn D.		
						Bloomington Drifts		
						Morengo D.		

EXPANDED QUATERNARY
STRATIGRAPHIC COLUMN

FIGURE

2.5

FROM WILLMAN, 1971

ERM ERM-North Central, Inc.

existing wells on-site; these thicknesses and units are inferred based upon geologic maps of the area and nearby production wells.

Area municipal water supply wells and industrial process water supply wells are typically completed in the bedrock aquifers in the vicinity of the Park Forest property. With the exception of the Hadley Valley area to the west of the Park Forest site, as well as discrete locations to the southeast, there is insufficient water within unconsolidated units above the bedrock to support production wells. Principal bedrock aquifers consist of the Cambrian aged Galesville-Ironton sandstones, the Ordovician aged Glenwood-St. Peter sandstones, Maquoketa Group dolomites, and the previously mentioned Niagaran dolomites.

The unconsolidated Quaternary deposits overlying the bedrock at the Park Forest site are predominantly clay and silt-rich tills with possible intermittent gravel or sand lenses. At some locations in this area, there is a significant sand and gravel aquifer at the base of the till deposit overlying the bedrock. Schicht, et al. (1976) illustrates this area on Figure 8 of their report and shows it to be an area where the basal sand and gravel aquifer is not likely present. Suter, et al. (1959) and Piskin and Bergstrom (1975) present geologic cross-sections of the Quaternary deposits for this area and illustrate possible intermittent lenses or interbeds of sands and gravel in the area. The authors do not believe that these are areally extensive units within the glacial till. With the exception of these sand and gravel lenses or the basal sand and gravel aquifer, the glacial till is relatively impermeable and can be considered an effective aquitard. Therefore, based on the available published data, it is unlikely that extensive permeable layers exist in the unconsolidated sediments below the site. Further, the published data also infers that an effective aquitard separates the near surface materials from the deeper bedrock aquifers.

The detailed stratigraphy beneath the Park Forest site is not known. There are no geologic logs for the existing wells on-site and no soil borings or monitoring wells have been installed at the site. Based upon the trenching and test pit investigations accomplished during Phase I, the subsurface materials are comparable to published descriptions of the Valparaiso till units. The water bearing and water transmitting characteristics for the remaining thickness of Quaternary deposits at the site are unknown at this time.

2.3.1.2 Deep Well Test Results

The plant has two on-site deep wells (Figure 2.1) providing both potable and process water. The primary supply well (Well No. 1) is reported by plant personnel to be 240 feet deep and 10 inches in diameter. This well and pump are housed inside the plant boiler building (Building 5). The second well, (Well No. 2), is the plant's standby well and is reported to be 140 feet deep and 6 inches in diameter. Well No. 2 is located outside of Quonset Hut Q-2. A review of the Illinois State Water Survey records did not uncover any logs for these wells. By knowing the sequence of building construction however, and how the site developed, it is clear that Well No. 2 was installed to serve the original Quonset Huts (Q-1, Q-2, Q-3 and Q-4). As the property developed, Well No. 1 was installed to replace the original well, and was made larger and deeper to provide more capacity. There are no plant records available as to when the wells were installed, nor how they are constructed.

The rental home located to the north of the main manufacturing building is served by a separate well (designated as Well No. 3), reportedly installed when the home was built. The depth of this well is unknown. Again, a search of the records at the Illinois State Water Survey did not find any log for this well.

The two plant wells (Well No. 1 and No. 2) were initially sampled on January 20, 1985, to insure plant management that the on-site potable water supply continued to be safe for employee consumption. These wells, and the well serving the rental home (Well No. 3), were again sampled on June 18, 1985. Field measurements included temperature, pH, salinity, and conductivity. The January 20, 1985, samples were analyzed for total metals, volatile organics and PCB's using EPA approved procedures for water samples as specified under 40 CFR Part 136.

For consistency with the overall June 18, 1985, sampling effort, water samples taken during this period were analyzed by procedures specified in SW-846.

The locations of the wells on the AMCA property are shown on Figure 2.1. Tables 2.1 and 2.2 summarizes the laboratory results for both the January 20, 1985 and the June 18, 1985 samples. The complete laboratory report for both sampling periods, along with the laboratory quality control summary report, is included in Appendix B.

As can be seen, the data on Tables 2.1 and 2.2 show no contamination of the deep aquifer directly under the plant or in the aquifer serving the rental home.

2.4 RESULTS: SURFACE WATERS AND BOTTOM SEDIMENTS

Grab samples of the unnamed stream at locations shown on Figure 2.2 were obtained on June 18, 1985. Additionally, a grab sample of the surface water had been obtained from Sample Location 2 on January 20, 1985 (see Deep Wells, above), as a preliminary screen to determine the potential existence and extent of any contaminants.

TABLE 2.1

WELL WATER ANALYSIS
METALS

Parameter	Well No. 1		Well No. 2		Well No. 3	
Sample Date	1/20/85		6/18/85		6/18/85	
Well Sample Number	4625-01		4625-02		51050-05	
Temperature, °C	11	9	9	9	15	15
pH	6.9	7.2	7.2	NA	NA	NA
Salinity, ‰	1.0	1.0	1.0	0.5	0.4	0.4
conductivity, umhos, cm	800	800	800	850	850	850
Metals, mg/l						
Aluminum	ND	ND	ND	NA	NA	NA
Antimony	ND	ND	ND	NA	NA	NA
Arsenic	ND	ND	ND	ND	ND	(0.002)
Barium	0.046	0.046	0.044	0.093	0.084	(0.005)
Beryllium	ND	ND	ND	NA	NA	NA
Boron	0.68	0.67	0.67	NA	NA	NA
Cadmium	ND	ND	ND	ND	ND	(0.004)
Calcium	140	130	130	NA	NA	NA
Chromium	ND	ND	ND	ND	ND	(0.005)
Cobalt	ND	ND	ND	NA	NA	NA
Copper	0.012	ND	ND	ND	0.006	(0.003)
Iron	0.14	ND	ND	NA	NA	NA
Lead	ND	ND	ND	ND	0.04	(0.025)
Magnesium	69	68	68	NA	NA	NA
Manganese	0.012	0.007	0.007	0.016	0.013	(0.005)
Mercury	NA	NA	NA	ND	ND	(0.0002)
Molybdenum	0.020	0.016	0.016	0.012	0.008	(0.005)
Nickel	ND	ND	ND	ND	ND	(0.01)
Phosphorus	ND	ND	ND	NA	NA	NA
Potassium	7.8	6.8	6.8	NA	NA	(0.004)
Selenium	ND	ND	ND	NA	NA	NA
Silica	10	9.7	9.7	NA	NA	NA
Silver	ND	ND	ND	NA	NA	NA
Sodium	21	20	20	NA	NA	NA
Strontium	1.1	1.1	1.1	NA	NA	NA
Tin	ND	ND	ND	NA	NA	NA
Titanium	ND	ND	ND	NA	NA	NA
Vanadium	ND	ND	ND	NA	NA	NA
Zinc	0.27	0.67	0.67	0.190	0.033	(0.005)

Detection Limits in Parentheses

ND = Not Detected

NA = Not Analyzed

TABLE 2.2

WELL WATER ANALYSIS
VOLATILE ORGANICS AND PCB'S

Parameter	Detection Limit	Well No. 1	Well No. 2	Well No. 3
Sample Date		1/20/85	5/18/85	5/18/85
RCMA Sample Number		4625-01	4625-02	51050-01
				51050-05
<u>Volatile Organics, ug/l</u>				
1V Acrolein	100	BOL	BOL	BOL
2V Acrylonitrile	100	BOL	BOL	BOL
3V Benzene	5	BOL	BOL	BOL
4V Bis(chloromethyl)ether	5	BOL	NA	NA
5V Bromoform	5	BOL	BOL	BOL
6V Carbon tetrachloride	5	BOL	BOL	BOL
7V Chlorobenzene	5	BOL	BOL	BOL
8V Chlorodibromomethane	5	BOL	BOL	BOL
9V Chloroethane	10	BOL	BOL	BOL
10V 2-Chloroethylvinyl ether	5	BOL	BOL	BOL
11V Chloroform	5	BOL	BOL	BOL
12V Dichlorobromomethane	5	BOL	BOL	BOL
13V Dichlorodifluoromethane	10	BOL	NA	NA
14V 1,1-Dichloroethane	5	BOL	BOL	BOL
15V 1,2-Dichloroethane	5	BOL	BOL	BOL
16V 1,1-Dichloroethylene	5	BOL	BOL	BOL
17V 1,2-Dichloropropane	5	BOL	BOL	BOL
18V 1,3-Dichloropropylene	5	BOL	BOL	BOL
19V Ethylbenzene	5	BOL	BOL	BOL
20V Methylbromide	10	BOL	BOL	BOL
21V Methylchloride	10	BOL	BOL	BOL
22V Methylene chloride	10	BOL	BOL	BOL
23V 1,1,2,2-Tetrachloroethane	5	BOL	BOL	BOL
24V Tetrachloroethylene	5	BOL	BOL	BOL
25V Toluene	5	BOL	BOL	BOL
26V 1,2-trans-Dichloroethylene	5	BOL	BOL	BOL
27V 1,1,1-Trichloroethane	5	BOL	BOL	BOL
28V 1,1,2-Trichloroethane	5	BOL	BOL	BOL
29V Trichloroethylene	5	BOL	BOL	BOL
30V Trichlorofluoromethane	10	BOL	NA	NA
31V Vinyl chloride	10	BOL	BOL	BOL
<u>PCB's, ppb/l</u>				
Aroclor 1016	0.0008	ND	ND	NA
Aroclor 1221	0.002	ND	ND	NA
Aroclor 1232	0.002	ND	ND	NA
Aroclor 1242	0.001	ND	ND	NA
Aroclor 1248	0.001	ND	ND	NA
Aroclor 1254	0.0005	ND	ND	NA
Aroclor 1260	0.0005	ND	ND	NA

ND = Not Detected
 NA = Not Analyzed
 BOL = Below Detection Limits

During the June 18, 1985, sampling effort, bottom sediments were taken at the same locations where grab surface water samples were taken. Sample Location 1 is the storm water discharge point immediately west of Western Avenue and under the plant's parking lot. Sample Location 2 is downstream from Sample Location 1, but upstream from where the parking lot storm water discharge joins the stream. Sample Location 3 is the stream flow, as it discharges from the marshy area under the dirt access road to the rental house. These Sample Locations are shown on Figure 2.2. Data from the above samples are summarized on Tables 2.3 and 2.4.

Data for Sample Location 1 shows no volatile organics or PCB's in either the surface water or bottom sediments. Metal concentrations for the surface water at Sample Location 1 are significantly less than regulatory standards and other characteristics (temperature, salinity) are within normal ranges.

Sample Location 3 shows organic concentrations in the bottom sediments for toluene (13000 ppb), 1,2-trans-Dichloroethylene (91000 ppb) and 1,1,1-Trichloroethylene (290000 ppb) with these organics at significantly lower concentrations approximately 75 feet downstream at Sample Location 2. These organics are the degreasing solvents normally associated with metal working operations. PCB concentrations in the bottom sediments at Sample Location 3 (310 ppm) significantly decrease (to 35 ppm) at Sample Location 2.

All of the bottom sediments show elevated heavy metals, particularly at Sample Location 3. Metals of concern include barium, cadmium, chromium, copper, lead, molybdenum, nickel and zinc. Mercury, at less than 1 ppm, was identified in the bottom sediments at Sample Location 3.

SURFACE WATER AND BOTTOM SEDIMENT ANALYSIS

Parameter	Sample Location 1		Sample Location 2		Sample Location 3	
	Surface Water 6/18/85	Bottom Sediment 6/18/85	Surface Water 6/18/85	Bottom Sediment 6/18/85	Surface Water 6/18/85	Bottom Sediment 6/18/85
RAW, Sample Number	51050-02	51050-14	4625-03	51050-03	51050-15	51050-15
Temperature, °C	18.5	—	1	19.2	—	—
pH	NA	—	7.8	NA	—	19.9
Salinity, ‰	0.6	—	1.0	0.9	—	NA
Conductivity, umhos, cm	1120	—	600	910	—	920
<u>Metals, mg/L</u>						
Aluminum	NA	NA	0.06	(0.05)	NA	NA
Antimony	NA	NA	ND	(0.09)	NA	NA
Arsenic	ND	1.9 (0.2)	ND	(0.05)	ND	3.8 (0.4)
Barium	0.11 (0.01)	59 (1.5)	0.065	(0.005)	0.037	70 (0.5)
Beryllium	NA	NA	ND	(0.001)	NA	NA
Boron	NA	NA	0.61	(0.01)	NA	NA
Cadmium	ND	8.7 (1.2)	ND	(0.006)	ND	3.4 (0.4)
Calcium	NA	NA	130	(0.1)	NA	NA
Chromium	0.01 (0.01)	94 (1.5)	ND	(0.005)	ND	170 (0.5)
Cobalt	NA	NA	ND	(0.006)	NA	NA
Copper	0.016 (0.006)	37 (0.9)	ND	(0.008)	0.006	73 (0.3)
Iron	NA	NA	0.13	(0.07)	NA	NA
Lead	0.19 (0.05)	100 (7.5)	ND	(0.05)	0.04	61 (2.5)
Magnesium	NA	NA	63	(0.2)	NA	NA
Manganese	0.08 (0.01)	170 (1.5)	0.035	(0.005)	0.018	160 (0.5)
Mercury	ND	ND	NA	(0.0002)	ND	2.8 (0.05)
Molybdenum	0.02 (0.01)	5.0 (1.5)	0.021	(0.005)	0.016	25 (0.5)
Nickel	ND	13 (3.0)	ND	(0.01)	ND	19 (1.0)
Phosphorus	NA	NA	ND	(0.4)	NA	NA
Potassium	NA	NA	6.7	(0.3)	NA	NA
Selenium	ND	ND	ND	(0.4)	ND	ND
Silica	NA	NA	9.6	(0.3)	NA	NA
Silver	NA	NA	ND	(0.004)	NA	NA
Sodium	NA	NA	19	(5.0)	NA	NA
Strontium	NA	NA	1.0	(0.005)	NA	NA
Tin	NA	NA	ND	(0.03)	NA	NA
Titanium	NA	NA	ND	(0.02)	NA	NA
Vanadium	NA	NA	ND	(0.004)	NA	NA
Zinc	0.13 (0.01)	60 (1.5)	1.3	(0.02)	0.027	410 (0.5)

Detection Limits in Parentheses
 ND = Not Detected
 NA = Not Analyzed

TABLE 2.4

SURFACE WATER AND BOTTOM SEDIMENT ANALYSIS
VOLATILE ORGANICS AND PCB'S

Parameter	Sample Location 1		Sample Location 2		Sample Location 3	
	Surface Water	Bottom Sediment	Surface Water	Bottom Sediment	Surface Water	Bottom Sediment
Sample Date	6/18/85	6/18/85	6/18/85	6/18/85	6/18/85	6/18/85
MWL Sample Number	51050-02	51050-14	51050-03	51050-15	51050-04	51050-16
Volatiles Organics, ug/l						
IV Acrolein	NDL (100)	NDL (100)	NDL (100)	NDL (100)	NDL (100)	NDL (250000)
2V Acrylonitrile	NDL (100)	NDL (100)	NDL (100)	NDL (100)	NDL (100)	NDL (250000)
3V Benzene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
5V Bromoform	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
6V Carbon tetrachloride	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
7V Chlorobenzene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
8V Chlorodibromomethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
9V Chloroethane	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (12500)
10V 2-Chloroethylvinyl ether	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
11V Chloroform	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
12V Dichloromethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
14V 1,1-Dichloroethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
15V 1,2-Dichloroethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
16V 1,1-Dichloroethylene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
17V 1,2-Dichloropropane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
18V 1,3-Dichloropropylene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
19V Ethylbenzene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
20V Methylbromide	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (25000)
21V Methylchloride	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (25000)
22V Methylene chloride	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
23V 1,1,2,2-Tetrachloroethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
24V Tetrachloroethylene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
25V Toluene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
26V 1,2-trans-Dichloroethylene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
27V 1,1,1-Trichloroethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
28V 1,1,2-Trichloroethane	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
29V Trichloroethylene	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (5)	NDL (12500)
31V Vinyl chloride	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (10)	NDL (25000)
PCB's, ug/kg						
Aroclor 1016	NA	ND (0.2)	ND (0.0004)	ND (2.0)	NA	ND (35)
Aroclor 1221	NA	ND (1.0)	ND (0.001)	ND (9.0)	NA	ND (150)
Aroclor 1232	NA	ND (0.7)	ND (0.001)	ND (7.0)	NA	ND (80)
Aroclor 1242	NA	ND (0.5)	ND (0.0005)	ND (2.0)	NA	ND (20)
Aroclor 1248	NA	ND (0.5)	0.001 (0.0005)	35 (2.0)	NA	ND (20)
Aroclor 1254	NA	ND (0.2)	ND (0.00025)	ND (1.0)	NA	ND (10)
Aroclor 1260	NA	ND (0.2)	ND (0.00025)	ND (1.0)	NA	ND (10)

Detection Limits in Parentheses

ND = Not Detected

NA = Not Analyzed

2.5 RESULTS: SHALLOW SOIL SAMPLES

2.5.1 Sampling Procedures

2.5.1.1 Area

As previously discussed, the approach used to design the Phase I shallow soil sampling plan was to identify, via employee interviews, reviews of aerial photographs, available plant records, and prior IEPA tests, those on-site areas where hand augers or backhoe pits should be used to effectively collect soil samples. The areas so identified are shown on Figure 2.3. The actual delineation of the areas (such as Area B - the Small Burn Area) was based on employee identification of subject areas in the field, on examination of the areas in successive aerial photographs taken at different times, on visual outline of the area based on changes in vegetation density, and on other visual indicators. For example, in the burn areas (Area B and Area D), some of the surface soils had a "scorched" appearance and ash/clinkers could be easily identified.

2.5.1.2 Grid Size

Based on these field observations, each area was broadly defined within a rectangular shaped border. The border was staked in the field, and each of the sides measured with a steel tape. The rectangular border was also tied into available fixed structures (fences, corner of concrete pads) so that the rectangle could be re-established if necessary, at a later date. Once the size and location of each rectangle was fixed, a grid was established, with grid spacing no greater than 50 feet. Each grid node established a discrete sampling point. Hand augered samples, to a total depth of four feet, were then taken at each sample node.

2.5.1.3 Compositing

Composite samples were collected from each sample node from the surface to 24 inch depth, and from the 24 inch to 48 inch depth. Visual observations were recorded as each sample hole progressed. Samples ultimately sent to the Laboratory (Rocky Mountain Analytical Laboratory) were composites made from the samples collected from each node. Composites were made up exclusively of samples from the same depth (i.e., samples from the 24 inch to 48 inch depth were only composited with samples from the same depth), and were established based on field observations. The selection of sample nodes for compositing was based on our plan to screen as much of the area being sampled as possible.

Compositing in this fashion is an effective preliminary sampling approach. It provides an efficient and reliable means of establishing an upper and lower concentration range for contaminants, and for identifying which contaminants are present from a broad spectrum of contaminants. Moreover, it establishes a valid data base from which more specific Phase II studies can be directed if they were to prove necessary. In sum, compositing in this manner is an especially useful and effective way to limit future testing to only those constituents which appear in the composites for any given area.

2.5.1.4 Roadway Backhoe Pits

With respect to the dirt roadway going back to the Imhoff tank, it was concluded that a series of backhoe trenches (or pits), which cut across the width of the roadway, would be the most effective way of visually identifying the depth of material on top of the native soil surface, as well as to allow for discrete sampling within the pit. Further, since a backhoe was to be on-site, it was decided also to dig a backhoe pit through Area B - the Small Burn Area, and an "X" in Area G.

2.5.1.5 Quality Controls/Chain of Custody/Blanks

Sampling procedures as specified in the April 4 work plan (Appendix A) were followed, as were chain-of-custody and other procedures. All samples were analyzed by the Laboratory using EPA procedures specified in SW-846. Appendix B is a copy of the complete laboratory report, including a quality control report.

As a significant aspect of quality control, a series of four (4) soil blanks were obtained from the area to the south and west of the Imhoff tank. These blanks were then composited and were analyzed along with all the other soil samples. The Laboratory results of these soil blanks were used for comparative purposes. For example, the Total Metals analyses on the soil blanks establishes both a range and average concentration for individual metals. Both the average and range, for each metal in these background soils can be compared to those values for the composites from the areas being investigated. Tables 2.5 and 2.6 summarize the laboratory data for the four soil blanks.

The following subsections describe the results obtained from the sampling/analytical procedures described above for each of those areas shown on Figure 2.3.

2.5.2 Results: Specific Soil Sampling Areas

2.5.2.1 Area A - Sludge Drying Beds

Tables 2.7 and 2.8 summarize the Laboratory results from tests of composite samples taken from the sludge drying beds. Figure 2.6 is a detailed drawing of the Imhoff tank and sludge drying beds, showing Sample Locations. Laboratory analyses were made on composite samples from the surface to 24 inch depth (from Sample Locations A-1, A-4, A-7, A-10, A-13 and A-16), and from the 24

TABLE 2.5

SOIL BLANKS
METALS AND PCB'S

Parameter	Detection Limit	Composite (J-1) 0 - 24"	Composite (J-2) 0 - 24"	Composite (J-3) 0 - 24"	Composite (J-4) 0 - 24"	Range	Average
Real Sample Number		51050-22	51050-23	51050-24	51050-25		
<u>Metals, mg/l</u>							
Arsenic	(0.4)	9.8	17	15	11	9.8 - 17	13
Barium	(0.5)	57	87	62	85	57 - 87	73
Cadmium	(0.4)	1.2	1.5	1.4	1.0	1.0 - 1.5	1.3
Chromium	(0.5)	22	21	26	31	21 - 31	25
Copper	(0.3)	19	14	20	20	14 - 20	18
Lead	(2.5)	18	21	17	36	17 - 36	23
Manganese	(0.5)	300	860	400	240	240 - 860	470
Mercury	(0.05)	ND	ND	ND	ND	ND	---
Molybdenum	(0.5)	ND	ND	ND	ND	ND	---
Nickel	(1.0)	29	17	26	17	17 - 29	22
Selenium	(2.0)	ND	ND	ND	ND	ND	---
Zinc	(0.5)	53	50	54	73	50 - 73	58
<u>PCB's, mg/kg</u>							
Aroclor 1016	(0.05)	ND	ND	ND	ND		
Aroclor 1221	(0.2)	ND	ND	ND	ND		
Aroclor 1232	(0.2)	ND	ND	ND	ND		
Aroclor 1242	(0.04)	ND	ND	ND	ND		
Aroclor 1248	(0.04)	ND	ND	ND	ND		
Aroclor 1254	(0.02)	ND	ND	ND	0.09		
Aroclor 1260	(0.02)	ND	ND	ND	ND		
pH, standard units	(0.01)	5.67	5.69	5.29	6.60	5.29 - 6.60	5.81
Total Cyanide, mg/kg	(0.01)	ND	ND	ND	ND	ND	---
Exchange Capacity	(0.05)	21	24	23	28	21 - 28	24
me, 100g							

Detection Limits in Parentheses
ND = Not Detected

TABLE 2.6

SOIL BLANKS
VOLATILE ORGANICS

Parameter	Detection Limit	Composite (J-1) 0 - 24"	Composite (J-2) 0 - 24"	Composite (J-3) 0 - 24"	Composite (J-4) 0 - 24"
Well Sample Number		51050-22	51050-23	51050-24	51050-25
<u>Volatile Organics, ug/l</u>					
1V Acrolein	(100)	BDL	BDL	BDL	BDL
2V Acrylonitrile	(100)	BDL	BDL	BDL	BDL
3V Benzene	(5)	BDL	BDL	BDL	BDL
5V Bromoform	(5)	BDL	BDL	BDL	BDL
6V Carbon tetrachloride	(5)	BDL	BDL	BDL	BDL
7V Chlorobenzene	(5)	BDL	BDL	BDL	BDL
8V Chlorodibromomethane	(5)	BDL	BDL	BDL	BDL
9V Chloroethane	(10)	BDL	BDL	BDL	BDL
10V 2-Chloroethylvinyl ether	(5)	BDL	BDL	BDL	BDL
11V Chloroform	(5)	BDL	BDL	BDL	BDL
12V Dichlorobromomethane	(5)	BDL	BDL	BDL	BDL
14V 1,1-Dichloroethane	(5)	BDL	BDL	BDL	BDL
15V 1,2-Dichloroethane	(5)	BDL	BDL	BDL	BDL
16V 1,1-Dichloroethylene	(5)	BDL	BDL	BDL	BDL
17V 1,2-Dichloropropane	(5)	BDL	BDL	BDL	BDL
18V 1,3-Dichloropropylene	(5)	BDL	BDL	BDL	BDL
19V Ethylbenzene	(5)	BDL	BDL	BDL	BDL
20V Methylbromide	(10)	BDL	BDL	BDL	BDL
21V Methylchloride	(10)	BDL	BDL	BDL	BDL
22V Methylene chloride	(10)	BDL	BDL	BDL	BDL
23V 1,1,2,2-Tetrachloroethane	(5)	BDL	BDL	BDL	BDL
24V Tetrachloroethylene	(5)	BDL	BDL	BDL	BDL
25V Toluene	(5)	BDL	BDL	BDL	BDL
26V 1,2-trans-Dichloroethylene	(5)	BDL	BDL	BDL	BDL
27V 1,1,1-Trichloroethane	(5)	BDL	BDL	BDL	BDL
28V 1,1,2-Trichloroethane	(5)	BDL	BDL	BDL	BDL
29V Trichloroethylene	(5)	BDL	BDL	BDL	BDL
31V Vinyl chloride	(10)	BDL	BDL	BDL	BDL

BDL = Below Detection Limits
Detection Limits in Parentheses

TABLE 2.7

AREA A - SLUDGE DRYING BEDS
METALS AND PCB'S

<u>Parameter</u>	<u>Detection Limit</u>	Composite (A-1, 4, 7, 10, 13 & 16) <u>0 - 24" Deep</u>	Composite (A-1, 4, 7, 10, 13 & 16) <u>24" - 48" Deep</u>
RMAL Sample Number		51050-28	51050-29
<u>Metals, mg/l</u>			
Arsenic	(0.2)	3.5	2.3
Barium	(1.0)	7.9	9.0
Cadmium	(0.8)	ND	ND
Chromium	(1.0)	33	13
Copper	(0.6)	9.3	9.9
Lead	(5.0)	11	9.0
Manganese	(1.0)	200	290
Mercury	(0.05)	ND	ND
Molybdenum	(1.0)	ND	ND
Nickel	(2.0)	8	10
Selenium	(2.0)	ND	ND
Zinc	(1.0)	47	42
<u>PCB's, mg/kg</u>			
Aroclor 1016		ND (0.07)	ND (0.04)
Aroclor 1221		ND (0.3)	ND (0.2)
Aroclor 1232		ND (0.3)	ND (0.2)
Aroclor 1242		ND (0.07)	ND (0.08)
Aroclor 1248		ND (0.07)	ND (0.08)
Aroclor 1254		ND (0.07)	ND (0.04)
Aroclor 1260		ND (0.07)	ND (0.04)
pH, standard units	(0.01)	6.81	6.88
Total Cyanide, mg/kg	(0.01)	ND	ND
Exchange Capacity me, 100g	(0.05)	2.1	0.60

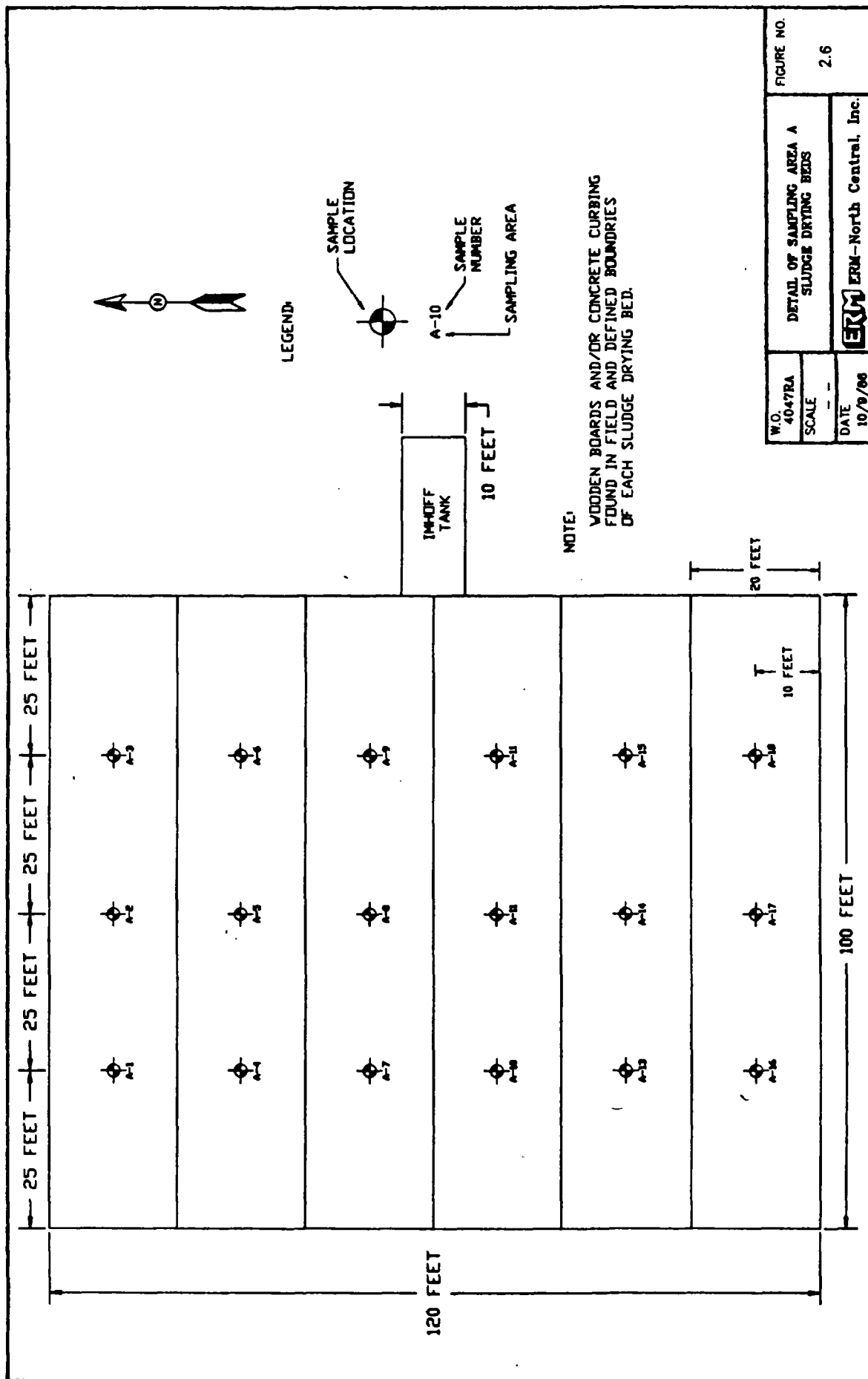
Detection Limits in Parentheses
ND = Not Detected

TABLE 2.8

AREA A - SELEGE DRYING BEDS
VOLATILE ORGANICS

Parameter	Detection Limit	Composite (A-1, 4, 7, 10, 13 & 16) 0 - 24"	Composite (A-1, 4, 7, 10, 13 & 16) 24 - 48"
RAWL Sample Number		51050-28	51050-29
<u>Volatile Organics, ug/l</u>			
1V Acrolein	(100)	BDL	BDL
2V Acrylonitrile	(100)	BDL	BDL
3V Benzene	(5)	BDL	BDL
5V Bromoform	(5)	BDL	BDL
6V Carbon tetrachloride	(5)	BDL	BDL
7V Chlorobenzene	(5)	BDL	BDL
8V Chlorodibromomethane	(5)	BDL	BDL
9V Chloroethane	(10)	BDL	BDL
10V 2-Chloroethylvinyl ether	(5)	BDL	BDL
11V Chloroform	(5)	BDL	BDL
12V Dichlorobromomethane	(5)	BDL	BDL
14V 1,1-Dichloroethane	(5)	BDL	BDL
15V 1,2-Dichloroethane	(5)	BDL	BDL
16V 1,1-Dichloroethylene	(5)	BDL	BDL
17V 1,2-Dichloropropane	(5)	BDL	BDL
18V 1,3-Dichloropropylene	(5)	BDL	BDL
19V Ethylbenzene	(5)	BDL	BDL
20V Methylbromide	(10)	BDL	BDL
21V Methylchloride	(10)	BDL	BDL
22V Methylene chloride	(10)	BDL	BDL
23V 1,1,2,2-Tetrachloroethane	(5)	BDL	BDL
24V Tetrachloroethylene	(5)	BDL	BDL
25V Toluene	(5)	BDL	BDL
26V 1,2-trans-Dichloroethylene	(5)	BDL	BDL
27V 1,1,1-Trichloroethane	(5)	BDL	BDL
28V 1,1,2-Trichloroethane	(5)	BDL	BDL
29V Trichloroethylene	(5)	BDL	BDL
31V Vinyl chloride	(10)	BDL	BDL

BDL = Below Detection Limits
Detection Limits in Parentheses



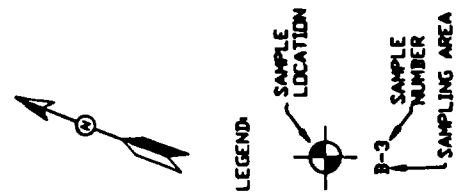
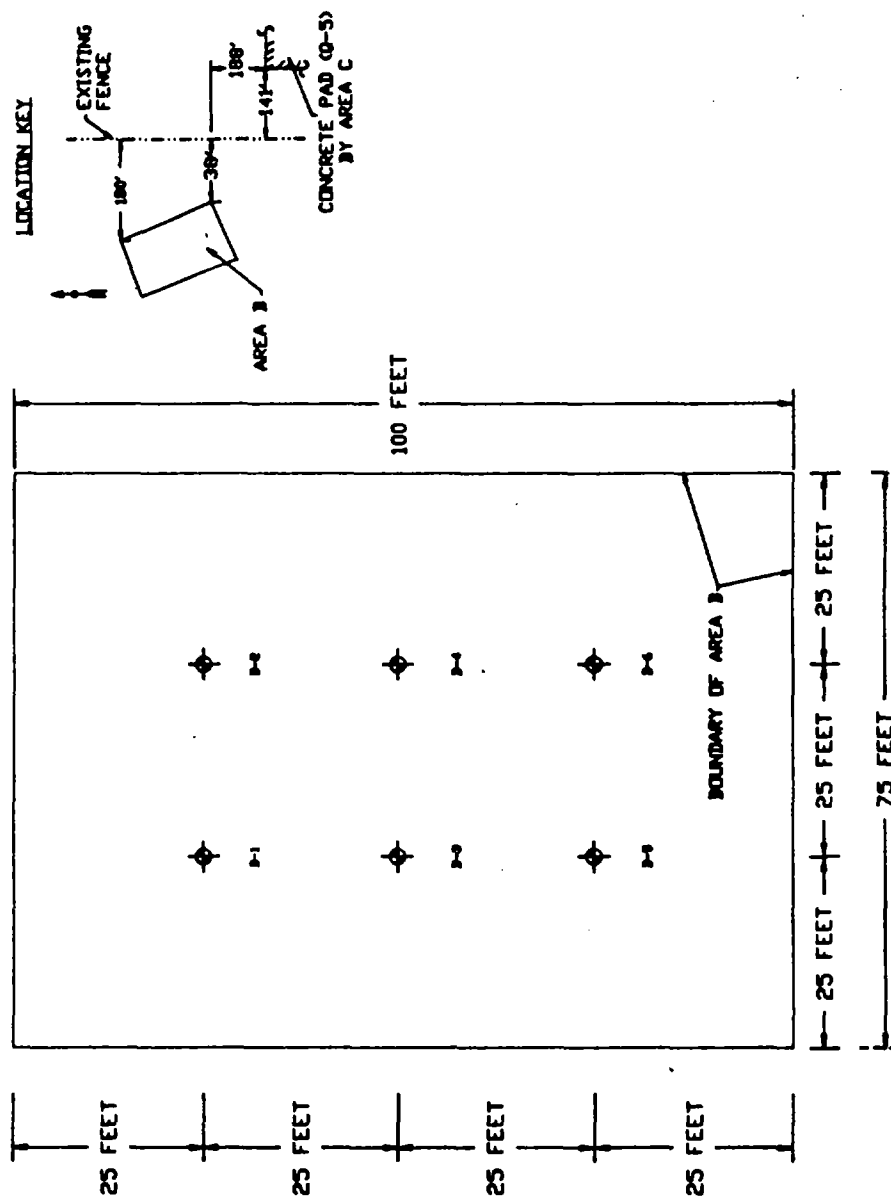
inch to 48 inch depth (from the same Sample Locations). The first 12 inches of soils within the sludge drying beds were very sandy, which was expected. At approximately the 12 inch depth, natural soils were encountered, which extended to the 4 foot level.

As can be seen from Tables 2.7 and 2.8, no PCB's or volatile organics were detected. Total metals are also at the lower range, which would be expected due to the sand base used in the sludge drying beds to promote dewatering.

2.5.2.2 Area B - Small Burn Area

Figure 2.7 is a detailed drawing of Area B, the small burn area. A composite soil sample from the surface to the 24 inch depth from Sample Locations B-1, B-3 and B-5, was sent to the Laboratory for complete analysis. The laboratory results, summarized on Tables 2.9 and 2.10, show that a trace amount of PCB's (0.2 and 0.25 ppm) was found in Area B along with copper and zinc at values above background levels as indicated by the soil blanks. All other metal concentrations are within soil blank ranges. Cation exchange rates of 8.1 and 23 me/100g indicate that the copper and zinc are unlikely to migrate far from the original source. Trace concentrations of methylene chloride (13 ppb) and trichloroethylene (29 ppb) were also found.

A ten foot long backhoe pit was also dug through Area B (designated as Pit No. 1) to a depth of approximately six feet. The pit was oriented in a general north-south direction, between Sample Locations B-1 to B-5 and B-2 to B-6, in the approximate center of Area B. Slight water seepage was noted at the bottom of the pit, but it was not possible to obtain a liquid sample. Sediments removed from the first several feet had a hydrocarbon odor, like that of fuel oil. The first 12 to 14 inches appear to be natural soils, mixed with ashes and large pieces of cinders.



W.O. 4047RA	DETAIL OF SAMPLING AREA B SMALL BURN AREA		FIGURE NO. 2.7
SCALE -- --			
DATE 10/9/86	ERM-North Central, Inc.		

TABLE 2.9

**AREA B - SMALL BURN AREA
METALS AND PCB'S**

Parameter	Detection Limit	Composite (B-1, 3 and 5) 0 - 24"	Backhoe Pit
RMAL Sample Number		51050-30	51050-07
<u>Metals, mg/l</u>			
Arsenic	(0.4)	8.0	7.9
Barium	(0.5)	56	67
Cadmium	(0.4)	1.3	1.1
Chromium	(0.4)	23	22
Copper	(0.3)	380	20
Lead	(2.5)	20	13
Manganese	(0.5)	380	360
Mercury	(0.05)	ND	ND
Molybdenum	(0.5)	ND	ND
Nickel	(1.0)	29	21
Selenium	(0.4)	ND	ND
Zinc	(0.5)	190	94
<u>PCB's, mg/kg</u>			
Aroclor 1016		ND (0.1)	ND (0.1)
Aroclor 1221		ND (0.5)	ND (0.5)
Aroclor 1232		ND (0.4)	ND (0.3)
Aroclor 1242		ND (0.2)	ND (0.1)
Aroclor 1248		ND (0.2)	ND (0.1)
Aroclor 1254		0.2 (0.1)	0.25 (0.06)
Aroclor 1260		ND (0.1)	ND (0.06)
pH, standard units	(0.01)	6.99	8.71
Total Cyanide, mg/kg	(0.01)	ND	ND
Exchange Capacity me, 100g	(0.05)	8.1	23

Detection Limits in Parentheses
ND = Not Detected

TABLE 2.10

AREA B - SMALL BURN AREA
VOLATILE ORGANICS

Parameter	Detection Limit	Composite (B-1, 3 & 5) 0 - 24"	Back Hoe Pit
Real Sample Number		51050-30	51050-07
<u>Volatile Organics, ug/l</u>			
1V Acrolein	(100)	ROL	ROL
2V Acrylonitrile	(100)	ROL	ROL
3V Benzene	(5)	ROL	ROL
5V Bromoform	(5)	ROL	ROL
6V Carbon tetrachloride	(5)	ROL	ROL
7V Chlorobenzene	(5)	ROL	ROL
8V Chlorodibromomethane	(5)	ROL	ROL
9V Chloroethane	(10)	ROL	ROL
10V 2-Chloroethylvinyl ether	(5)	ROL	ROL
11V Chloroform	(5)	ROL	ROL
12V Dichlorobromomethane	(5)	ROL	ROL
14V 1,1-Dichloroethane	(5)	ROL	ROL
15V 1,2-Dichloroethane	(5)	ROL	ROL
16V 1,1-Dichloroethylene	(5)	ROL	ROL
17V 1,2-Dichloropropane	(5)	ROL	ROL
18V 1,3-Dichloropropylene	(5)	ROL	ROL
19V Ethylbenzene	(5)	ROL	ROL
20V Methylbromide	(10)	ROL	ROL
21V Methylchloride	(10)	ROL	ROL
22V Methylene chloride	(10)	13	ROL
23V 1,1,2-Tetrachloroethane	(5)	ROL	ROL
24V Tetrachloroethylene	(5)	ROL	ROL
25V Toluene	(5)	ROL	ROL
26V 1,2-trans-Dichloroethylene	(5)	ROL	ROL
27V 1,1,1-Trichloroethane	(5)	ROL	ROL
28V 1,1,2-Trichloroethane	(5)	ROL	ROL
29V Trichloroethylene	(5)	29	ROL
31V Vinyl chloride	(10)	ROL	ROL

ROL = Below Detection Limits
Detection Limits in Parentheses

Below this surface material is a distinctive charred layer, approximately one to two inches thick. This layer varies widely however, and was almost 12 inches thick toward the south end of the pit.

Below the cinder layer are natural, greenish brown clay deposits, 12 to 18 inches thick, grading abruptly into a stiff, oily smelling and feeling clay.

The observations made from the backhoe pit confirmed those observations made from the hand borings within Area B. The observations made during these hand borings are summarized below:

<u>SAMPLE LOCATION</u>	<u>0 - 24 INCH DEPTH</u>	<u>24 - 48 INCH DEPTH</u>
B-1	grayish-white to greenish gray, some cinders, soil dry	soil becoming moist, darker clay color, some cinders, fuel oil odor
B-2	brownish-gray dark clay, blocky texture, some pebbles, no odor	greenish-gray clay, very dry, crumbly, no odor
B-3	cinders, greenish-gray clay, stiff, some sand, fuel oil odor	fuel oil odor stronger, clay darker in color
B-4	greenish-gray stiff clay, fuel oil odor, some cinders, clay blocky in texture	blue-gray, dry blocky clay, odor not as strong as 0 to 24 inch depth some pebbles
B-5	moist, brown clay, mottled, becoming dryer with depth	dry, blocky texture, slight fuel oil odor
B-6	cinders, burnt odor, clay as in B-5	gray, dry clay

2.5.2.3 Area C - Temporary Drum Storage Area

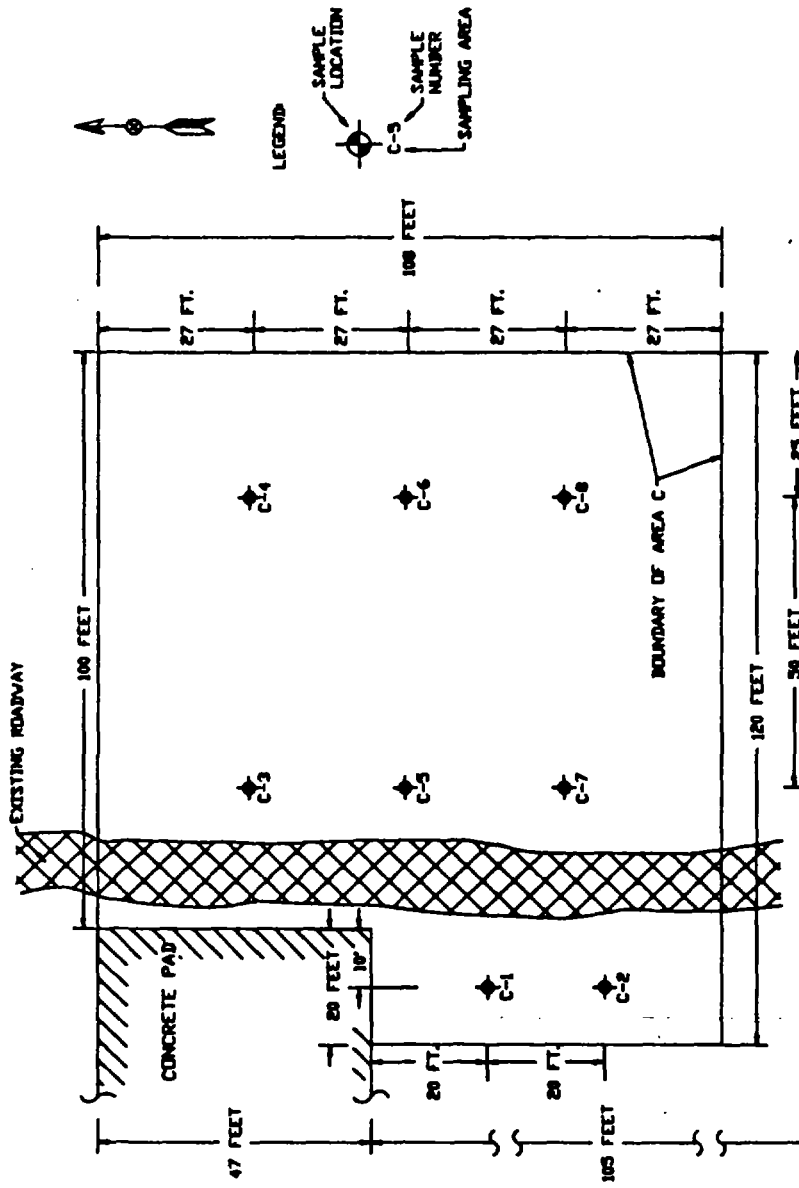
Figure 2.8 is a detailed drawing of the temporary drum storage area located adjacent to the concrete pad where the Quonset Hut Q-5 was located. Tables 2.11 and 2.12 summarize the analytical data for composite samples analyzed from this area.

Composite samples were collected as follows:

<u>COMPOSITE FROM SAMPLE LOCATIONS</u>	<u>DEPTH</u>
C-1 & C-9	0 to 24 inch
C-1, C-2 & C-9	24 to 48 inch
C-3 & C-4	0 to 24 inch
C-3 & C-4	24 to 48 inch

In general, the field notes for Area C show the same general shallow soils structure, a light brown to greenish-gray clay towards the surface (1 to 24 inch depth) changing to a stiffer bluish-gray to brown clay at the lower depths (24 to 48 inches). Sample locations C-9, C-10 and C-11 also had small (1/2 to 1 inch) flecks or pieces of what appeared to be cured paint, both yellow and red in color, as well as a strong solvent-like odor. None of the other Sample Locations in Area C were noted to have any odors.

A review of Tables 2.11 and 2.12 shows trace amounts of PCB's down to the four foot level. Copper, lead, and molybdenum



NOTE: SAMPLE LOCATIONS C-9, C-10 AND C-11 WERE LOCATED IN APPROXIMATE CENTER OF DRAINAGE SWALE

W.O.	4047RA	FIGURE NO.	2.8
SCALE	--	DETAIL OF SAMPLING AREA C	DRUM STORAGE AREA
DATE	10/16/96	ERM	ERM-North Central, Inc.

TABLE 2.11

AREA C - DRUM STORAGE AREA
METALS AND PCB'S

Parameter	Detection Limit	Composite (C-1 & 9) 0 - 24"	Composite (C-1, 2 & 9) 24" - 48"	Composite (C-10 & 11) 24" - 48"	Composite (C-3 & 4) 0 - 24"	Composite (C-3 & 4) 24" - 48"
REFL Sample Number		51050-31	51050-32	51050-40	51050-33	51050-34
<u>Metals, mg/l</u>						
Arsenic	(0.4)	10	14	7.4	8.6	6.6
Barium	(0.5)	82	55	42	87	77
Cadmium	(0.4)	1.2	1.0	0.8	1.3	1.0
Chromium	(0.5)	44	26	28	23	23
Copper	(0.3)	26	23	24	21	20
Lead	(2.5)	48	26	41	20	13
Manganese	(0.5)	350	530	410	290	270
Mercury	(0.05)	ND	ND	ND	ND	ND
Molybdenum	(0.5)	ND	ND	1.3	ND	ND
Nickel	(1.0)	25	30	25	24	27
Selenium	(2.0)	ND	ND	ND	ND	ND
Zinc	(0.5)	52	53	48	75	52
<u>PCB's, mg/kg</u>						
Aroclor 1016		ND	ND	ND	ND	ND
Aroclor 1221		ND	ND	ND	ND	ND
Aroclor 1232		ND	ND	ND	ND	ND
Aroclor 1242		ND	ND	ND	ND	ND
Aroclor 1248		0.2	ND	0.09	ND	ND
Aroclor 1254		ND	0.07	ND	0.07	ND
Aroclor 1260		ND	ND	ND	ND	ND
pH, standard units	(0.01)	6.74	6.19	3.16	6.09	2.84
Total Cyanide, mg/kg	(0.01)	ND	ND	ND	ND	ND
Exchange Capacity	(0.05)	11	8.2	8.0	16	14
mg, 100g						

Detection Limits in Parentheses
ND = Not Detected

TABLE 2.12
AREA C - DRUM STORAGE AREA
VOLATILE ORGANICS

Parameter	Composite (C-1 & 9) 0 - 24"	Composite (C-1, 2 & 9) 24" - 48"	Composite (C-10 & 11) 24" - 48"	Composite (C-3 & 4) 0 - 24"	Composite (C-3 & 4) 24" - 48"
RAW Sample Number	51050-31	51050-32	51050-40	51050-33	51050-34
Volatile Organics, ug/L					
1V Acrolein	BDL (2500)	BDL (500)	BDL (1000)	BDL (100)	BDL (100)
2V Acrylonitrile	BDL (2500)	BDL (500)	BDL (1000)	BDL (100)	BDL (100)
3V Benzene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
5V Bromoform	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
6V Carbon tetrachloride	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
7V Chlorobenzene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
8V Chlorodibromomethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
9V Chloroethane	BDL (250)	BDL (50)	BDL (100)	BDL (10)	BDL (10)
10V 2-Chloroethylvinyl ether	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
11V Chloroform	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
12V Dichlorobromomethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
14V 1,1-Dichloroethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
15V 1,2-Dichloroethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
16V 1,1-Dichloroethylene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
17V 1,2-Dichloropropane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
18V 1,3-Dichloropropylene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
19V Ethylbenzene	BDL 420	BDL 62	BDL 62	BDL (5)	BDL (5)
20V Methylbenzene	BDL (250)	BDL (50)	BDL (100)	BDL (10)	BDL (10)
21V Methylchloride	BDL (250)	BDL (50)	BDL (100)	BDL (10)	BDL (10)
22V Methylene chloride	BDL (250)	BDL (50)	BDL 21	BDL (5)	BDL (5)
23V 1,1,2,2-Tetrachloroethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
24V Tetrachloroethylene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
25V Toluene	BDL 3500	BDL 180	BDL 830	BDL (5)	BDL (5)
26V 1,2-trans-Dichloroethylene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
27V 1,1,1-Trichloroethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
28V 1,1,2-Trichloroethane	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
29V Trichloroethylene	BDL (125)	BDL (25)	BDL (50)	BDL (5)	BDL (5)
31V Vinyl chloride	BDL (250)	BDL (50)	BDL (100)	BDL (10)	BDL (10)

BDL = Below Detection Limits
Detection Limits in Parentheses

concentrations are above background levels but the Cation Exchange Capacity readings (11, 8.2, 8, 16, and 14 me/100g) indicate that significant migration of the metals in the soils is unlikely to occur. Soil pH for composites C-10, C-11, C-3 and C-4 is very low. Moderate to high levels of organics (toluene, ethyl benzene and methylene chloride) were found at the four foot level within the drainage ditch just west of the gravel roadway and would account for the solvent-like odor detected during the sampling. The organics do not, however, appear on the east side of the roadway.

2.5.2.4 Area D - Large Burn Area

Figure 2.9 is a detailed drawing of the large burn area. Tables 2.13 and 2.14 summarize the laboratory data for those composite samples analyzed.

Composite soil samples were collected as follows:

<u>COMPOSITE FROM SAMPLE LOCATIONS</u>	<u>DEPTH</u>
D-1	0 to 24 inch
D-3	0 to 24 inch
D-6 & D-9	0 to 24 inch

Field notes for the hand borings in Area D show that the top two feet of soil appears to be a loamy material, with burnt, ash-like cinders and clinkers mixed within the soils. The amounts of

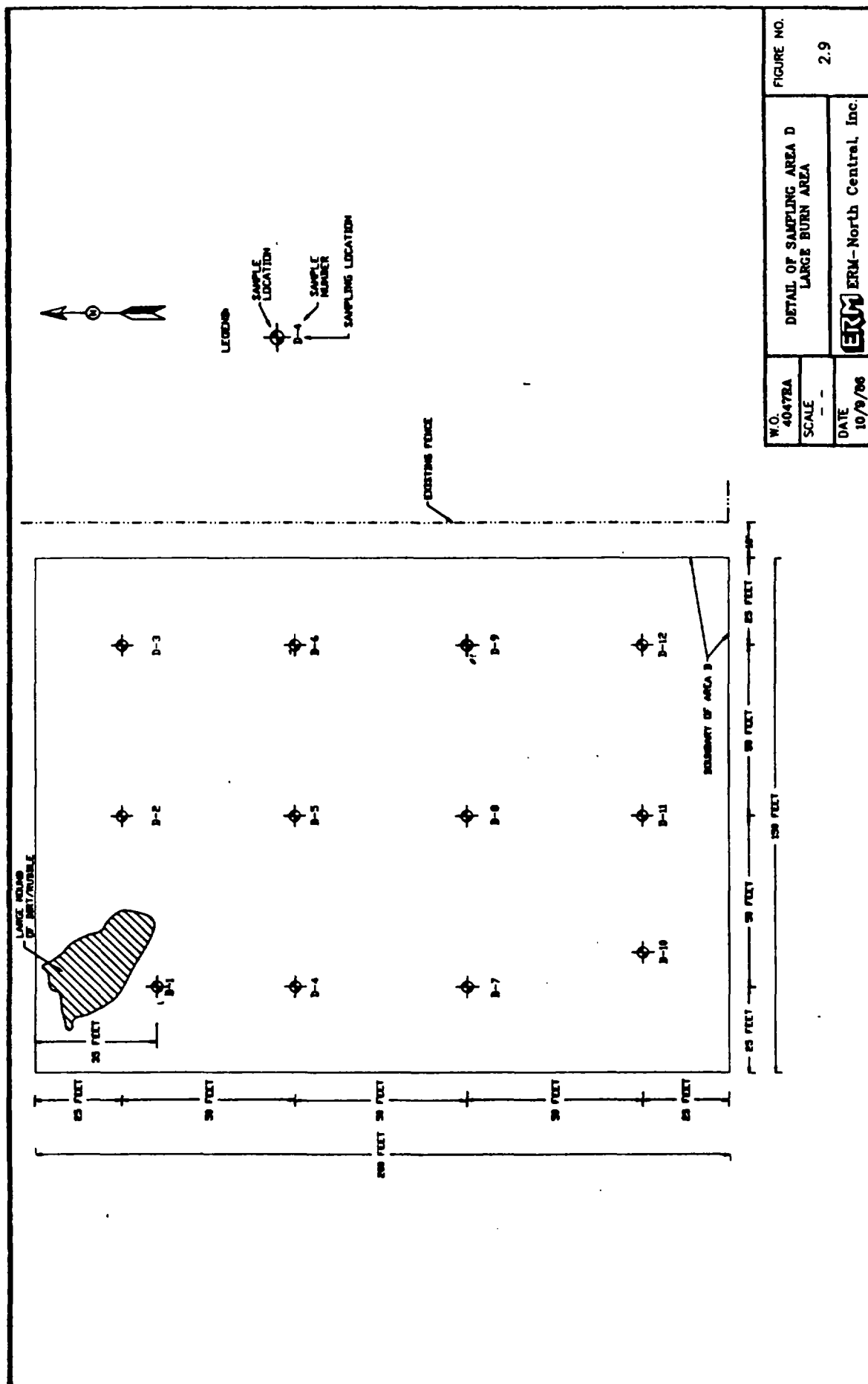


TABLE 2.13

AREA D - LARGE BURN AREA
METALS AND PCB'S

<u>Parameter</u>	<u>Detection Limit</u>	<u>Composite (D-6, & D-9) 0 - 24"</u>	<u>Composite (D-1) 0 - 24"</u>	<u>Composite (D-3) 0 - 24"</u>
RMAL Sample Number		51050-39	51050-17	51050-18
<u>Metals, mg/l</u>				
Arsenic	(0.4)	11	6.3	6.0
Barium	(0.5)	120	220	130
Cadmium	(0.4)	3.8	5.2	7.3
Chromium	(0.5)	45	110	74
Copper	(0.3)	140	130	190
Lead	(2.5)	82	1600	130
Manganese	(0.5)	550	1500	540
Mercury	(0.05)	ND	ND	ND
Molybdenum	(0.5)	1.3	12	15
Nickel	(1.0)	27	38	46
Selenium	(2.0)	ND	ND	ND
Zinc	(0.5)	310	150	320
<u>PCB's, mg/kg</u>				
Aroclor 1016		ND (0.2)	ND (0.6)	ND (0.4)
Aroclor 1221		ND (0.8)	ND (2)	ND (2)
Aroclor 1232		ND (0.6)	ND (2)	ND (1.5)
Aroclor 1242		ND (0.2)	ND (0.6)	ND (0.4)
Aroclor 1248		2.6 (0.2)	8 (0.6)	130 (0.4)
Aroclor 1254		ND (0.1)	ND (0.3)	ND (0.2)
Aroclor 1260		ND (0.1)	ND (0.3)	ND (0.2)
pH, standard units	(0.01)	3.17	8.59	8.49
Total Cyanide, mg/kg	(0.01)	0.10	1.30	0.20
Exchange Capacity me, 100g	(0.05)	16	15	23

Detection Limits in Parentheses
ND = Not Detected

TABLE 2.14

AREA D - LARGE BURN AREA
VOLATILE ORGANICS

Parameter	Sample Number	Composite (D-6 & D-9) 0 - 24"	Composite (D-1) 0 - 24"	Composite (D-3) 0 - 24"
<u>Volatiles Organics, ug/l</u>				
1V Acrolein		BDL (500)	BDL (100)	BDL (100)
2V Acrylonitrile		BDL (500)	BDL (100)	BDL (100)
3V Benzene		BDL (25)	BDL (5)	BDL (5)
5V Bromoform		BDL (25)	BDL (5)	BDL (5)
6V Carbon tetrachloride		BDL (25)	BDL (5)	BDL (5)
7V Chlorobenzene		BDL (25)	BDL (5)	BDL (5)
8V Chlorodibromomethane		BDL (25)	BDL (5)	BDL (5)
9V Chloroethane		BDL (50)	BDL (10)	BDL (10)
10V 2-Chloroethylvinyl ether		BDL (25)	BDL (5)	BDL (5)
11V Chloroform		BDL (25)	BDL (5)	BDL (5)
12V Dichlorobromomethane		BDL (25)	BDL (5)	BDL (5)
14V 1,1-Dichloroethane		BDL (25)	BDL (5)	BDL (5)
15V 1,2-Dichloroethane		BDL (25)	BDL (5)	BDL (5)
16V 1,1-Dichloroethylene		BDL (25)	BDL (5)	BDL (5)
17V 1,2-Dichloropropane		BDL (25)	BDL (5)	BDL (5)
18V 1,3-Dichloropropylene		BDL (25)	BDL (5)	BDL (5)
19V Ethylbenzene		BDL (25)	BDL (5)	BDL (5)
20V Methylbromide		BDL (50)	BDL (10)	BDL (10)
21V Methylchloride		BDL (50)	BDL (10)	BDL (10)
22V Methylene chloride		81	17	BDL (10)
23V 1,1,2,2-Tetrachloroethane		BDL (25)	BDL (5)	BDL (5)
24V Tetrachloroethylene		29	BDL (5)	BDL (5)
25V Toluene		BDL (25)	BDL (5)	BDL (5)
26V 1,2-trans-Dichloroethylene		180	BDL (5)	BDL (5)
27V 1,1,1-Trichloroethane		BDL (25)	BDL (5)	BDL (5)
28V 1,1,2-Trichloroethane		BDL (25)	BDL (5)	BDL (5)
29V Trichloroethylene		34	BDL (5)	BDL (5)
31V Vinyl chloride		BDL (50)	BDL (10)	BDL (10)

BDL = Below Detection Limits
Detection Limits in Parentheses

cinders/clinkers vary significantly. Sample Locations D-1 and D-4 for example, show no cinders within the top 24 inches. From the 24 to 48 inch depth, the soils appear to be the same type of brown to bluish gray clays found in the other sampling locations. In several locations (Sample Locations D-2, D-5, D-8, D-11 and D-12), there appears to be a gravel layer, at about the 12 to 15 inch depth, which caused the termination of the hand augered boring at these locations.

A fuel oil odor was noted only at Sample Locations D-6 and D-9, and at both the 0 to 24 inch and the 24 to 48 inch depth.

The laboratory data on Tables 2.13 and 2.14 shows PCB concentrations of 2.6, 8.0, and 130 ppm and concentrations of barium, cadmium, chromium, copper, lead, molybdenum, nickel and zinc above background levels as indicated from the soil blanks. Cation Exchange Capacity for this location, as with other areas at the site, was consistently high (16, 15, and 23 me/100g), indicating a low probability of metals migration in the soil. Soil pH for Composite D-6 and D-9 was low. Volatile organics were found, but at relatively low levels. Cyanide was detected in Area D, although at low concentrations.

2.5.2.5 Area E - Northwest Corner Inside Fence Line

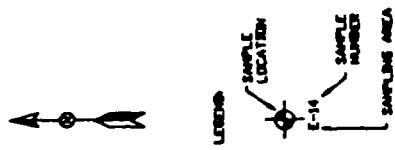
Figure 2.10 is a detailed drawing of the sampling locations within Area E. Tables 2.15, 2.16, 2.17 and 2.18 summarize the data from composite samples analyzed for this area.

Composite samples were collected as follows:

<u>COMPOSITE FROM SAMPLE LOCATIONS</u>	<u>DEPTH</u>
E-1	0 to 24 inch
E-11	0 to 24 inch
E-7, E-8, E-9 & E-10	0 to 48 inch
E-15	0 to 24 inch
E-15 & E-16	24 to 48 inch

The area shown between the existing roadway and the northern fence line (Sample Locations E-3 through E-10) was within a mound of dirt/rubble that was reportedly from grading conducted in the truck turn around area, immediately west of the main manufacturing building. As part of this grading, a drainage ditch was constructed that directs surface water run-off toward the west, under the gate, and continues west for about 150 feet. At that point, the drainage ditch merges into a natural drainage pattern which redirects run-off to the north and east, into the marshy area. Sample Locations E-1, E-2 and E-11 through E-14 are in the approximate center of the drainage ditch.

Sample Locations E-15 and E-16 were selected because surface water run-off from Areas D and G appears to flow to the fence



SITES

D LOCATIONS E-1, E-2, E-11, E-12, E-13
AND E-14 WERE LOCATED IN APPROPRIATE
CENTER OF BRANAGE SWALE.

D LOCATIONS E-2, E-4, E-5, AND E-6
ADJACENT TO FENCE, NOT SAMPLED.


W.O. 4047RA	DETAIL OF SAMPLING AREA E ALONG NORTHWEST CORNER INSIDE FENCE LINE	 ERMA - North Central, Inc.	FIGURE NO. 2.10
SCALE -- --			
DATE 10/9/88			

TABLE 2.15

AREA E - NORTH OF ROADWAY
METALS AND PCB'S

<u>Parameter</u>	<u>Detection Limit</u>	<u>Composite (E-7, 8, 9 & 10) 0 - 48"</u>	<u>Composite (E-11) 0 - 24"</u>	<u>Composite (E-1) 0 - 24"</u>
RMAL Sample Number		51050-35	51050-20	51050-19
<u>Metals, mg/l</u>				
Arsenic	(0.4)	10	8.3	13
Barium	(0.5)	45	30	38
Cadmium	(0.4)	1.1	0.6	0.7
Chromium	(0.5)	20	39	120
Copper	(0.3)	23	18	16
Lead	(2.5)	14	12	9.6
Manganese	(0.5)	370	310	300
Mercury	(0.05)	0.05	ND	ND
Molybdenum	(0.5)	ND	ND	ND
Nickel	(1.0)	32	23	23
Selenium	(4.0)	ND	ND	ND
Zinc	(0.5)	62	44	45
<u>PCB's, mg/kg</u>				
Aroclor 1016		ND (0.1)	ND (0.4)	ND (0.4)
Aroclor 1221		ND (0.2)	ND (2)	ND (2)
Aroclor 1232		ND (0.3)	ND (1.5)	ND (1.5)
Aroclor 1242		ND (0.1)	ND (0.4)	ND (0.4)
Aroclor 1248		ND (0.1)	17 (0.4)	3.8 (0.4)
Aroclor 1254		ND (0.05)	ND (0.2)	ND (0.2)
Aroclor 1260		ND (0.05)	ND (0.2)	ND (0.2)
pH, standard units	(0.01)	2.90	8.69	8.68
Total Cyanide, mg/kg	(0.01)	ND	ND	ND
Exchange Capacity me, 100g	(0.05)	13	12	15

Detection Limits in Parentheses

ND = Not Detected

TABLE 2.16
AREA 2 - NORTH OF ROADWAY
VOLATILE ORGANICS

Parameter	Detection Limit	Composite (E-7, 8, 9 & 10) 0 - 48°	Composite (E-11) 0 - 24°	Composite (E-1) 0 - 24°
REF. Sample Number		51050-35	51050-20	51050-19
<u>Volatiles Organics, ug/l</u>				
1V Acrolein	(100)	BDL	BDL	BDL
2V Acrylonitrile	(100)	BDL	BDL	BDL
3V Benzene	(5)	BDL	BDL	BDL
5V Bromoform	(5)	BDL	BDL	BDL
6V Carbon tetrachloride	(5)	BDL	BDL	BDL
7V Chlorobenzene	(5)	BDL	BDL	BDL
8V Chlorodibromomethane	(5)	BDL	BDL	BDL
9V Chloroethane	(10)	BDL	BDL	BDL
10V 2-Chloroethylvinyl ether	(5)	BDL	BDL	BDL
11V Chloroform	(5)	BDL	BDL	BDL
12V Dichlorobromomethane	(5)	BDL	BDL	BDL
14V 1,1-Dichloroethane	(5)	BDL	BDL	BDL
15V 1,2-Dichloroethane	(5)	BDL	BDL	BDL
16V 1,1-Dichloroethylene	(5)	BDL	BDL	BDL
17V 1,2-Dichloropropane	(5)	BDL	BDL	BDL
18V 1,3-Dichloropropylene	(5)	BDL	BDL	BDL
19V Ethylbenzene	(5)	BDL	BDL	BDL
20V Methylbenzene	(10)	BDL	BDL	BDL
21V Methylchloride	(10)	BDL	BDL	BDL
22V Methylene chloride	(10)	12	16	14
23V 1,1,2,2-Tetrachloroethane	(5)	BDL	BDL	BDL
24V Tetrachloroethylene	(5)	BDL	BDL	BDL
25V Toluene	(5)	BDL	BDL	BDL
26V 1,2-Trans-Dichloroethylene	(5)	BDL	7	45
27V 1,1,1-Trichloroethane	(5)	BDL	BDL	BDL
28V 1,1,2-Trichloroethane	(5)	BDL	BDL	BDL
29V Trichloroethylene	(5)	BDL	120	33
31V Vinyl chloride	(10)	BDL	BDL	BDL

BDL = Below Detection Limits
Detection Limits in Parentheses

TABLE 2.17

AREA E - ALONG FENCE LINE
METALS AND PCB'S

<u>Parameter</u>	<u>Detection Limit</u>	<u>Composite (E-15) 0 - 24"</u>	<u>Composite (E-15 & 16) 24" - 48"</u>
RMAL Sample Number		51050-21	51050-36
<u>Metals, mg/l</u>			
Arsenic	(0.4)	5.3	9.6
Barium	(0.5)	48	65
Cadmium	(0.4)	1.1	1.7
Chromium	(0.5)	21	21
Copper	(0.3)	12	26
Lead	(2.5)	17	24
Manganese	(0.5)	160	530
Mercury	(0.05)	ND	ND
Molybdenum	(0.5)	ND	ND
Nickel	(1.0)	14	28
Selenium	(4.0)	ND	ND
Zinc	(0.5)	250	100
<u>PCB's, mg/kg</u>			
Aroclor 1016		ND (0.05)	ND (0.1)
Aroclor 1221		ND (0.2)	ND (0.2)
Aroclor 1232		ND (0.2)	ND (0.2)
Aroclor 1242		ND (0.04)	ND (0.05)
Aroclor 1248		ND (0.04)	ND (0.05)
Aroclor 1254		ND (0.02)	ND (0.02)
Aroclor 1260		ND (0.02)	ND (0.02)
pH, standard units	(0.01)	6.43	2.78
Total Cyanide, mg/kg	(0.01)	ND	ND
Exchange Capacity me, 100g	(0.05)	21	11

Detection Limits in Parentheses

ND = Not Detected

line at approximately Sample Location E-16, and from that point along the fence to the drainage ditch previously described.

Sampling within Area E using hand augers was very difficult due to the extremely tight clay layer. At Sample Locations E-1, E-2 and E-11 through E-14 (all within the drainage ditch), a very stiff, wet, light brown clay was encountered. Hand borings could not be extended beyond 24 inches in depth.

Sample Locations E-7 through E-10 were at the highest point of the mound of dirt/rubble. Field observations show a brown, crumbly clay from the surface to 24 inches in depth, changing to a brown, flaky clay at 24 to 36 inches in depth, and a very stiff, light brown clay below that. No odors were detected in any of these holes.

A review of the data in Tables 2.15 and 2.16 show low soil pH, PCB's at low concentrations (17 and 3.8 ppm) and chromium levels above background levels. Again, however, as is typical of soils at the site, the Cation Exchange Capacity of Area E (13, 12, 15, 21, and 11 me/100g) indicates that any existing chromium concentration is unlikely to migrate. A trace amount of degreasing solvents was also found.

Tables 2.17 and 2.18, for the sampling conducted at Sample Locations E-15 and E-16, show low soil pH, no PCB's, elevated

copper and zinc, and moderate levels of degreasing solvents at the 24 to 48 inch depth.

2.5.2.6 Area F - Old Temporary Drum Storage Area

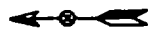
Figure 2.11 shows the Sample Locations for those samples taken in a second outside temporary drum storage area, as identified by plant personnel. Tables 2.19 and 2.20 summarize the laboratory results for the composite samples from this area.

Composites obtained from Area F were as follows:

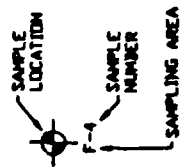
<u>COMPOSITE FROM SAMPLE LOCATIONS</u>	<u>DEPTH</u>
F-1, F-2, F-3 & F-4	0 to 48 inch
F-5 & F-6	0 to 48 inch

Sample Locations F-1, F-2, F-3 and F-4 were selected because they were located within a low lying area where surface drainage would accumulate, and where a slight greenish staining was noted. Sample Locations F-5 and F-6 were located along the fence line. Surface water run-off from Area D, which is just to the west of the north-south fence, also generally flows toward Sample Location F-5 and F-6.

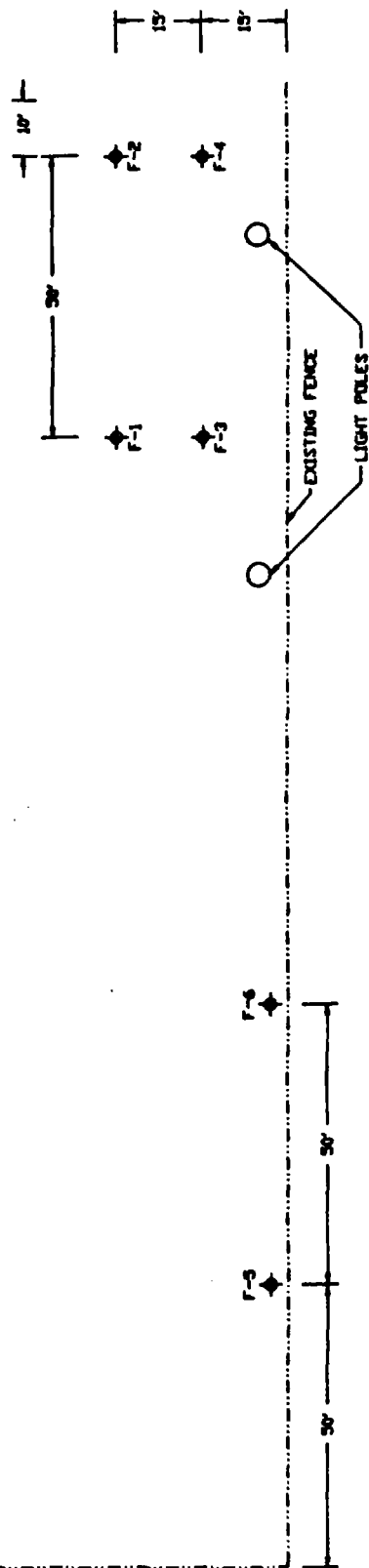
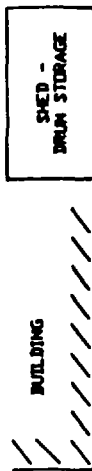
At Sample Locations F-1 to F-4, the top 12 to 18 inches was found to be compacted gravel and consequently a shovel had to be used to a depth where hand augering could be started. The material



LEGEND



EXISTING FENCE



W.O. 4047RA		FIGURE NO.
SCALE --		2.11
DATE 10/9/86		
ERM North Central Inc.		

TABLE 2.19

AREA F - SOUTH OF STORAGE BUILDING
METALS AND PCB'S

<u>Parameter</u>	<u>Detection Limit</u>	<u>Composite (F-1, 2, 3 & 4) 0 - 48"</u>	<u>Composite (F-5 & 6) 0" - 48"</u>
RMAL Sample Number		51050-37	51050-38
<u>Metals, mg/l</u>			
Arsenic	(0.4)	14	19
Barium	(0.5)	270	67
Cadmium	(0.4)	1.0	1.3
Chromium	(0.5)	98	25
Copper	(0.3)	34	24
Lead	(2.5)	13	16
Manganese	(0.5)	370	440
Mercury	(0.05)	ND	ND
Molybdenum	(0.5)	ND	ND
Nickel	(1.0)	27	34
Selenium	(4.0)	ND	ND
Zinc	(0.5)	62	82
<u>PCB's, mg/kg</u>			
Aroclor 1016		ND (0.9)	ND (0.04)
Aroclor 1221		ND (3)	ND (0.2)
Aroclor 1232		ND (3)	ND (0.1)
Aroclor 1242		ND (0.9)	ND (0.04)
Aroclor 1248		560 (0.9)	0.13 (0.04)
Aroclor 1254		ND (0.4)	ND (0.02)
Aroclor 1260		ND (0.4)	ND (0.02)
pH, standard units	(0.01)	3.10	3.08
Total Cyanide, mg/kg	(0.01)	ND	ND
Exchange Capacity me, 100g	(0.05)	9.5	14

Detection Limits in Parentheses
ND = Not Detected

TABLE 2.20

AREA P - SOUTH OF STORAGE BUILDING
VOLATILE ORGANICS

Parameter	Detection Limit	Composite (P-1, 2, 3 & 4) 0 - 48"	Composite (P-5 & 6) 0 - 48"
RAW Sample Number		51050-37	51050-38
<u>Volatile Organics, ug/l</u>			
1V Acrolein	(100)	BDL	BDL
2V Acrylonitrile	(100)	BDL	BDL
3V Benzene	(5)	BDL	BDL
5V Bromoform	(5)	BDL	BDL
6V Carbon tetrachloride	(5)	BDL	BDL
7V Chlorobenzene	(5)	BDL	BDL
8V Chlorodibromomethane	(5)	BDL	BDL
9V Chloroethane	(10)	BDL	BDL
10V 2-Chloroethylvinyl ether	(5)	BDL	BDL
11V Chloroform	(5)	BDL	BDL
12V Dichlorobromomethane	(5)	BDL	BDL
14V 1,1-Dichloroethane	(5)	BDL	BDL
15V 1,2-Dichloroethane	(5)	BDL	BDL
16V 1,1-Dichloroethylene	(5)	BDL	BDL
17V 1,2-Dichloropropane	(5)	BDL	BDL
18V 1,3-Dichloropropylene	(5)	BDL	BDL
19V Ethylbenzene	(5)	BDL	BDL
20V Methylbromide	(10)	BDL	BDL
21V Methylchloride	(10)	BDL	BDL
22V Methylene chloride	(10)	60	22
23V 1,1,2,2-Tetrachloroethane	(5)	BDL	BDL
24V Tetrachloroethylene	(5)	BDL	BDL
25V Toluene	(5)	BDL	BDL
26V 1,2-trans-Dichloroethylene	(5)	BDL	BDL
27V 1,1,1-Trichloroethane	(5)	BDL	BDL
28V 1,1,2-Trichloroethane	(5)	BDL	BDL
29V Trichloroethylene	(5)	29	BDL
31V Vinyl chloride	(10)	BDL	BDL

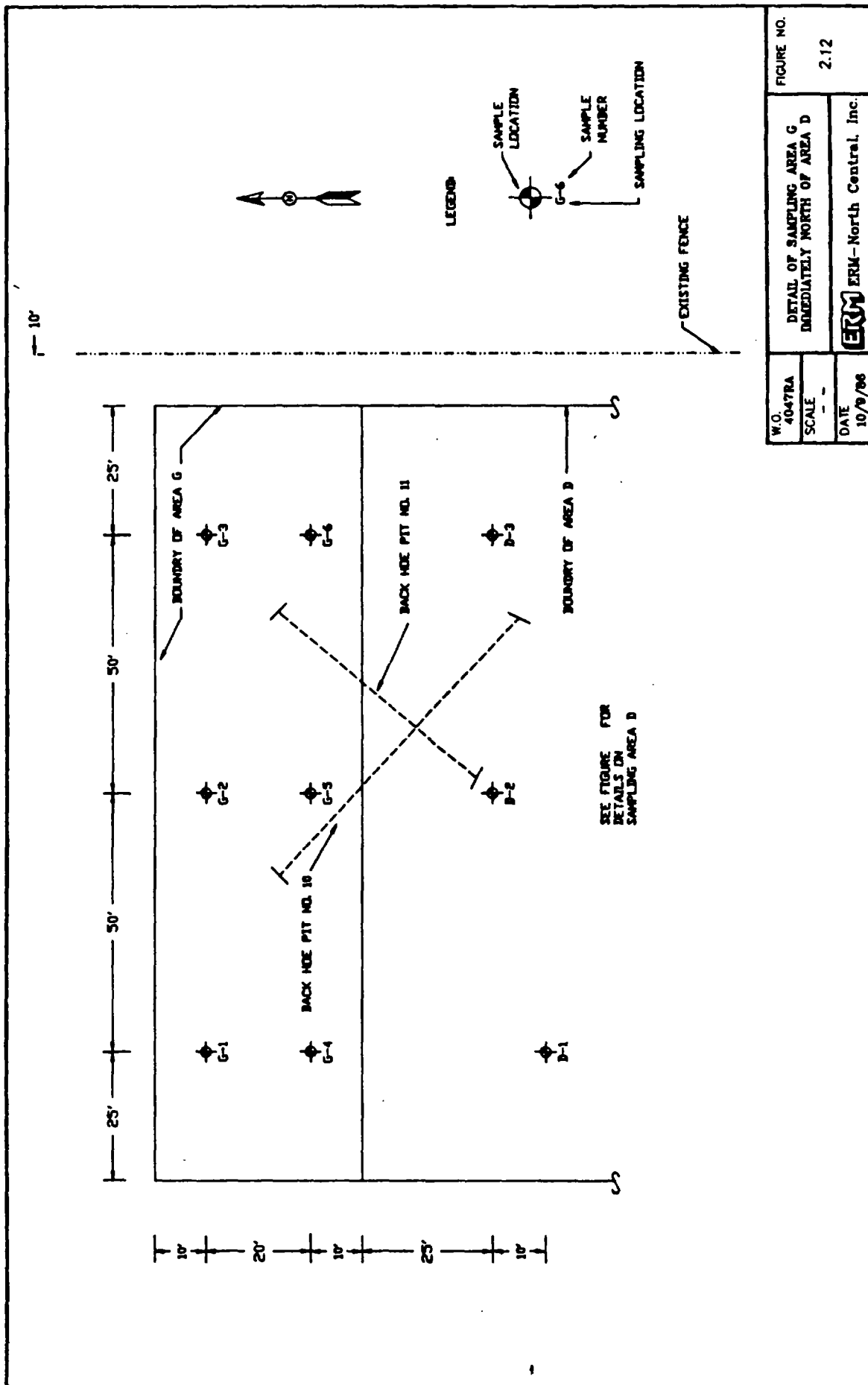
BDL = Below Detection Limits
Detection Limits in Parentheses

beneath the gravel was noted to be the light-to-dark brown clays previously described, down to the 48 inch depth. No unusual odors were noted in any of the soils. Data in Tables 2.19 and 2.20 for the composite from these four holes show the highest level of PCB's found in the Phase I studies (560 ppm). Additionally, low concentrations of degreasing solvents, elevated barium and chromium and a low soil pH was found.

At Sample Locations F-5 and F-6, the top 12 inches was noted to be a dark brown to black soil, with a heavy grass/weed root system. Soils from the 12 inch to 48 inch depth were the clays previously described. A fuel oil odor was detected at both Sample Locations. Data on Tables 2.19 and 2.20 show low soil pH, a trace of PCB's, and an elevated zinc concentration in soils with high (14me/100g) cation exchange capacity. A trace of methylene chloride was also detected.

2.5.2.7 Area G - Immediately North of Area D

Figure 2.12 is a detailed drawing of Area G, which was identified because of small mounds of dirt/rubble throughout the area. Since considerable soil sampling had occurred in both Areas C and D, it was decided to do backhoe pits (Nos. 10 and 11) through Area G and into Area D. Consequently, although hand augering was conducted at the locations indicated (G-1 through G-6), no



W.O. 4047RA	FIGURE NO.
SCALE --	2.12
DATE 10/10/06	ERM North Central, Inc.

laboratory analyses were performed on the samples obtained. Visual observations, however, were recorded.

No unusual odors and/or other visual indicators were noted from the soils samples taken from the six hand borings. Soils and clays, as previously described for Area C (Location C-3 to C-8) were found.

With respect to the backhoe pits, two intersecting trenches, as shown on Figure 2.12, were constructed, each trench being about 75 feet long. These trenches were located approximately due west from the plant water tower.

Test Pit No. 10 was excavated in a northwesterly/southeasterly direction, and was about six to seven feet deep. Test Pit No. 11 was excavated in a northeasterly/southwesterly direction and was also about six to seven feet deep. During excavation a clay tile pipe, about four feet below the surface, was broken and some water flowed into the bottom of the pit. From its evident direction and from studying the aerial photographs, this tile is clearly the original sewer going back to the Imhoff tank.

Visual observations from these two pits can be summarized as follows:

- o There appears to be about 18 inches of clean fill material with abundant roots overlying granular, dry sandy soils. This sandy layer is underlain with an olive green clay, with some embedded cinders, which is very hard and dry. This clay gradually changes to a dark greenish gray clay, mottled with fine roots throughout. This greenish gray clay gradually changed to a light brown to bluish gray clay with some sand and gravel.

Three composite soil samples were taken from these Test Pits: a sample of the olive green clays noted to have embedded cinders, from Test Pit No. 10, at above the three foot depth, and designated as "Pit No. 10A" on Tables 2.21 and 2.22; a sample of the material above the olive green clays, from Test Pit No. 11, at about the three foot depth, and designated as "Pit No. 11A" on Tables 2.21 and 2.22; and, a composite clay sample from about the four foot depth, from both Test Pits No. 10 and 11, and designated as "Pit No. 10/11B" on Tables 2.21 and 2.22.

Data from these composite samples show elevated metals, a high Cation Exchange Capacity , PCB's (0.3 and 69 ppm), and a trace of degreasing solvents.

TABLE 2.21

BACKHOE PITs - COMPOSITES
METALS AND PCB'S

<u>Parameter</u>	<u>Detection Limit</u>	<u>Pit No. 10A (0-3')</u>	<u>Pit No. 11A (0-3')</u>	<u>Pit No. 10/11B</u>
RMAL Sample Number		51050-11	51050-12	51050-13
<u>Metals, mg/l</u>				
Arsenic	(0.4)	3.5	26	6.8
Barium	(0.5)	91	300	100
Cadmium	(0.4)	1.0	7.0	1.5
Chromium	(0.5)	29	110	28
Copper	(0.3)	38	600	25
Lead	(2.5)	17	130	17
Manganese	(0.5)	140	5.0	410
Mercury	(0.05)	ND	ND	ND
Molybdenum	(0.5)	ND	5.5	ND
Nickel	(1.0)	21	45	35
Selenium	(2.0)	ND	ND	ND*
Zinc	(0.5)	69	710	59
<u>PCB's, mg/kg</u>				
Aroclor 1016		ND (0.2)	ND (0.5)	ND (0.2)
Aroclor 1221		ND (1.0)	ND (2)	ND (1.0)
Aroclor 1232		ND (2)	ND (1.5)	ND (0.7)
Aroclor 1242		ND (1.0)	ND (0.5)	ND (0.5)
Aroclor 1248		ND (1.0)	69 (0.5)	ND (0.5)
Aroclor 1254		ND (0.7)	ND (0.3)	0.3 (0.1)
Aroclor 1260		ND (0.7)	ND (0.3)	ND (0.1)
pH, standard units	(0.01)	8.09	8.91	8.32
Total Cyanide, mg/kg	(0.01)	ND	0.10	ND
Exchange Capacity me, 100g	(0.05)	9.7	19	16

Detection Limits in Parentheses

ND = Not Detected

* Detection Limit at 4.0 mg/l

TABLE 2.22

BROOKS PITS
VOLATILE ORGANICS

Parameter	Detection Limit	Pit No. 10A	Pit No. 11A	Pit No. 10/11B
Reel Sample Number		51050-11	51050-12	51050-13
<u>Volatile Organics, ug/l</u>				
1V Acrolein	(100)	BDL	BDL	BDL
2V Acrylonitrile	(100)	BDL	BDL	BDL
3V Benzene	(5)	BDL	BDL	BDL
5V Bromoform	(5)	BDL	BDL	BDL
6V Carbon tetrachloride	(5)	BDL	BDL	BDL
7V Chlorobenzene	(5)	BDL	BDL	BDL
8V Chlorodibromomethane	(5)	BDL	BDL	BDL
9V Chloroethane	(10)	BDL	BDL	BDL
10V 2-Chloroethylvinyl ether	(5)	BDL	BDL	BDL
11V Chloroform	(5)	BDL	BDL	BDL
12V Dichlorobromomethane	(5)	BDL	BDL	BDL
14V 1,1-Dichloroethane	(5)	BDL	BDL	BDL
15V 1,2-Dichloroethane	(5)	BDL	BDL	BDL
16V 1,1-Dichloroethylene	(5)	BDL	BDL	BDL
17V 1,2-Dichloropropane	(5)	BDL	BDL	BDL
18V 1,3-Dichloropropylene	(5)	BDL	BDL	BDL
19V Ethylbenzene	(5)	BDL	BDL	BDL
20V Methylbromide	(10)	BDL	BDL	BDL
21V Methylchloride	(10)	BDL	BDL	BDL
23V Methylene chloride	(5)	BDL	BDL	BDL
23V 1,1,2,2-Tetrachloroethane	(5)	BDL	BDL	BDL
24V Tetrachloroethylene	(5)	BDL	BDL	BDL
25V Toluene	(5)	BDL	BDL	BDL
26V 1,2-trans-Dichloroethylene	(5)	BDL	BDL	BDL
27V 1,1,1-Trichloroethane	(5)	BDL	BDL	BDL
28V 1,1,2-Trichloroethane	(5)	BDL	BDL	BDL
29V Trichloroethylene	(5)	BDL	BDL	BDL
31V Vinyl chloride	(10)	BDL	BDL	BDL

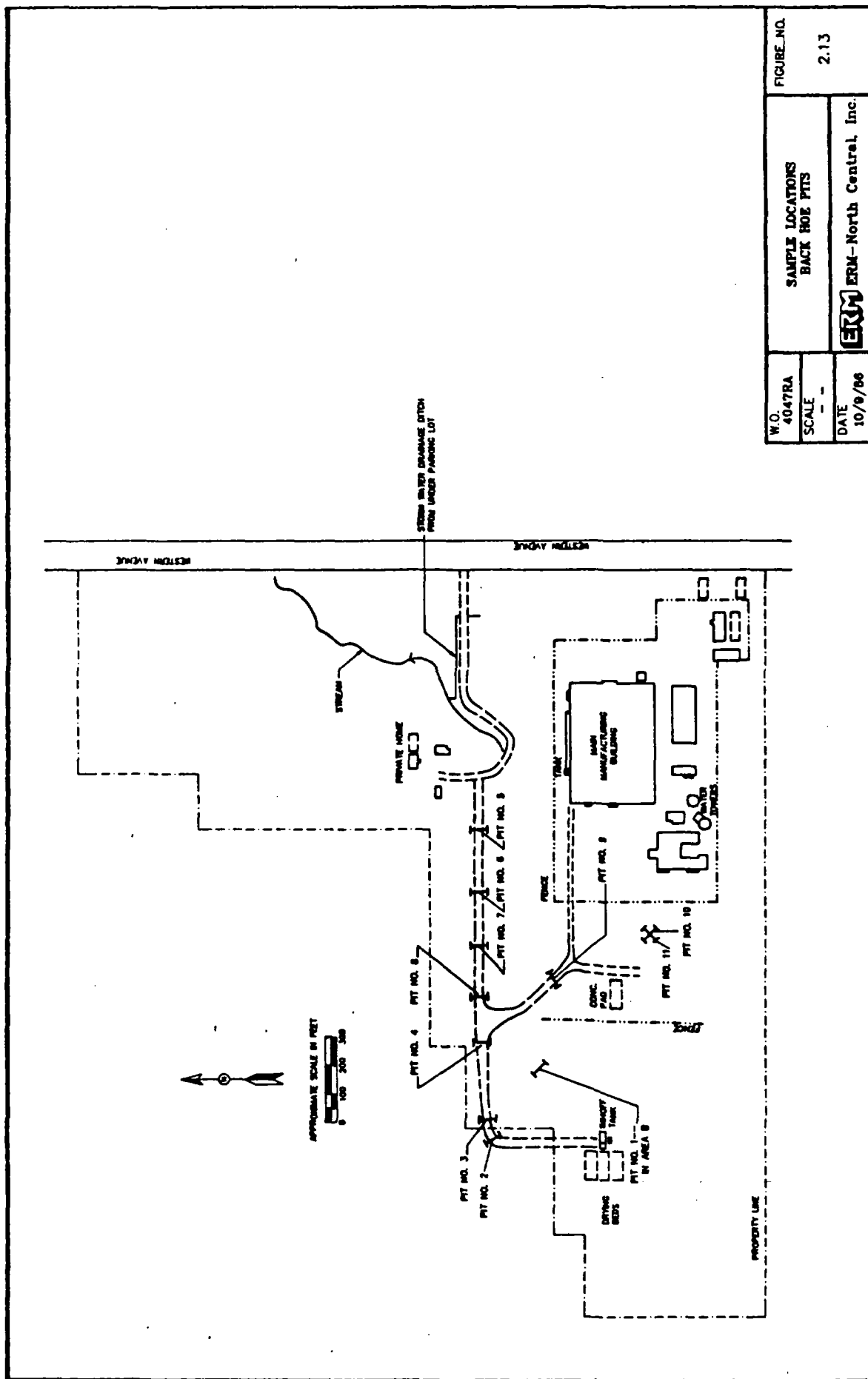
BDL = Below Detection Limits
Detection Limits in Parentheses

2.5.2.8 Backhoe Pits

Figure 2.13 shows the location of the backhoe pits cut into both the dirt roadway and Area G. As previously discussed, backhoe trenches were cut across the roadway to obtain a cross-section and vertical profile of the soils between the roadway to a depth of about six feet.

Grab samples were taken at various locations within each pit, based solely on visual observations. Any unusual looking material was sampled. Random composites were made from several backhoe pits as a means of identifying gross contamination and vertical distribution. The laboratory results for the soil samples submitted for the remainder of the backhoe pits are shown in Tables 2.23 and 2.24. The data indicates the presence of PCB's (33, 0.34, 15, and 26 ppm), elevated metals, and low levels of degreasing solvents. The data also suggests a uniform distribution of materials along the entire length of the roadway from the "Y" junction just north of the Quonset Hut Q-5 concrete pad, and along the east-west portion of the roadway which goes from the Imhoff tank toward the access road to the rental home. This area was originally identified in Figure 2.3.

The following summarizes the field observations from the individual backhoe trenches (Figure 2.13):



W.O.	4047RA	FIGURE NO.	2.13
SCALE	1" = 100'	SAMPLE LOCATIONS	BACK HOE PITS
DATE	10/9/86	ERM	ERM-North Central, Inc.

TABLE 2.23
BIOGORE PITTS
METALS AND PCB'S

Parameter	Pit No. 8A (0-2')	Pit No. 8B (3'-6')	Pit No. 9	Pit No. 2, 3 & 4	Pit No. 5, 6 & 7
	51050-08	51050-09	51050-10	51050-26	51050-27
<u>Metals, mg/l</u>					
Arsenic	12 (0.8)	14 (0.8)	5.2 (0.4)	13 (0.4)	17 (0.4)
Barium	560 (1.0)	50 (0.5)	44 (1.0)	100 (0.5)	440 (0.5)
Cadmium	23 (0.8)	1.9 (0.4)	ND (0.8)	4.6 (0.4)	21 (0.4)
Chromium	240 (1.0)	22 (0.5)	53 (1.0)	74 (0.5)	860 (0.5)
Copper	2100 (0.6)	32 (0.3)	42 (0.6)	140 (0.3)	810 (0.3)
Lead	630 (5.0)	26 (2.5)	19 (5.0)	200 (2.5)	370 (2.5)
Manganese	870 (1.0)	450 (0.5)	360 (1.0)	520 (0.5)	850 (0.5)
Mercury	0.1 (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Molybdenum	76 (1.0)	ND (0.5)	ND (1.0)	9.9 (0.5)	41 (0.5)
Nickel	120 (2.0)	31 (1.0)	28 (2.0)	36 (1.0)	91 (1.0)
Selenium	ND (0.4)	ND (0.4)	ND (4.0)	ND (2.0)	ND (2.0)
Zinc	1900 (1.0)	64 (0.5)	53 (1.0)	210 (0.5)	470 (0.5)
<u>PCB's, mg/kg</u>					
Atoclor 1016	ND (0.5)	ND (0.05)	ND (0.05)	ND (1)	ND (0.9)
Atoclor 1221	ND (2)	ND (0.2)	ND (0.2)	ND (5)	ND (4)
Atoclor 1232	ND (2)	ND (0.1)	ND (0.1)	ND (4)	ND (3)
Atoclor 1242	ND (0.5)	ND (0.05)	ND (0.05)	ND (1)	ND (0.9)
Atoclor 1248	33 (0.5)	ND (0.05)	0.34 (0.05)	15 (1)	25 (0.9)
Atoclor 1254	ND (0.3)	ND (0.02)	ND (0.02)	ND (0.7)	ND (0.5)
Atoclor 1260	ND (0.3)	ND (0.02)	ND (0.02)	ND (0.7)	ND (0.5)
pH, standard units	9.12	7.03	8.28	6.89	6.89
Total Cyanide, mg/kg	0.30	ND	0.10	0.20	0.40
Exchange Capacity me, 100 g	19	18	9.7	19	19

Detection Limits in Parentheses
ND = Not Detected

TABLE 2.24
BOL FOR PITS
VOLATILE ORGANICS

Parameter	Detection Limit	Pic No. 8A (0-2')	Pic No. 8B (3'-6')	Pic No. 9	Pic No. 2, 3 & 4	Pic No. 5, 6 & 7
NEW Sample Number		51050-08*	51050-09	51050-10	51050-26	51050-27
<u>Volatile Organics, ug/l</u>						
1V Acrolein	(100)	BOL	BOL	BOL	BOL	BOL
2V Acrylonitrile	(100)	BOL	BOL	BOL	BOL	BOL
3V Benzene	(5)	BOL	BOL	BOL	BOL	BOL
5V Bromoform	(5)	BOL	BOL	BOL	BOL	BOL
6V Carbon tetrachloride	(5)	BOL	BOL	BOL	BOL	BOL
7V Chlorobenzene	(5)	BOL	BOL	BOL	BOL	BOL
8V Chlorodibromomethane	(5)	BOL	BOL	BOL	BOL	BOL
9V Chloroethane	(10)	BOL	BOL	BOL	BOL	BOL
10V 2-Chloroethylvinyl ether	(5)	BOL	BOL	BOL	BOL	BOL
11V Chloroform	(5)	BOL	BOL	BOL	BOL	BOL
12V Dichlorobromomethane	(5)	BOL	BOL	BOL	BOL	BOL
14V 1,1-Dichloroethane	(5)	BOL	BOL	BOL	BOL	BOL
15V 1,2-Dichloroethane	(5)	BOL	BOL	BOL	BOL	BOL
16V 1,1-Dichloroethylene	(5)	BOL	BOL	BOL	BOL	BOL
17V 1,2-Dichloropropane	(5)	BOL	BOL	BOL	BOL	BOL
18V 1,3-Dichloropropylene	(5)	BOL	BOL	BOL	BOL	BOL
19V Ethylbenzene	(5)	BOL	BOL	BOL	BOL	BOL
20V Methyl bromide	(10)	BOL	BOL	BOL	BOL	BOL
21V Methyl chloride	(10)	BOL	BOL	BOL	BOL	BOL
22V Methylene chloride	(10)	BOL	BOL	BOL	BOL	BOL
23V 1,1,2,2-Tetrachloroethane	(5)	BOL	BOL	BOL	BOL	BOL
24V Tetrachloroethylene	(5)	BOL	BOL	BOL	BOL	BOL
25V Toluene	(5)	BOL	BOL	BOL	BOL	BOL
26V 1,2-trans-Dichloroethylene	(5)	550	14	BOL	BOL	BOL
27V 1,1,1-Trichloroethane	(5)	BOL	BOL	BOL	BOL	BOL
28V 1,1,2-Trichloroethane	(5)	BOL	BOL	BOL	BOL	BOL
29V Trichloroethylene	(5)	BOL	BOL	BOL	BOL	BOL
31V Vinyl chloride	(10)	BOL	BOL	BOL	BOL	BOL

BOL = Below Detection Limits
Detection Limits in Parentheses
* All detection limits for sample 51050-08 are ten times that shown.

TEST PIT NO.1: See discussion at "Small Burn Area" (2.5.2.2 above).

TEST PIT NO. 2: Test Pit No. 2 is located at the edge of the road leading back towards the Imhoff tank. The approximately seven feet deep pit is oriented in a north-south direction from the southern edge of the road to the crown of the road. Water was not observed in the bottom of the pit. The crown of the road appears to be approximately three feet thick and is composed of gravel and clinker-like material. The top of the roadway is relatively dry. The road is typically composed of granular gray material overlying some dark brown to black granular material with some clay. There appears to be some cured paint residue mixed in with the fill material. There is a sub-base approximately 2 to 4 inches thick beneath the granular material which thins to the south and then abruptly changes into a natural reddish-brown to gray clay, highly mottled. The root zone is present at the base of the fill material. Deposits beneath the fill are stiff clays, with moist blocky texture grading into gray clay, with fine roots, which is also highly mottled. Clay deposits appear drier towards the bottom of the pit. No unusual odors were encountered in this pit. Beneath the road base and gravel fill, soils appear relatively clean.

TEST PIT NO. 3: Test Pit No. 3 is located approximately 100 feet east of Test Pit No. 2 at the edge of the road near the

trail leading into the forest preserve. Test Pit No. 3 is approximately seven feet deep. Road bed and fill material appears to have been carried by surface water run-off approximately 10 to 15 feet northwest of the road towards the trail. Fill material thins from about 18 to 24 inches on the southern edge of the pit to about 1 to 1-1/2 or 2 inches on the north end of the pit. Soil profile similar to Test Pit No. 2. Road bed material looks like burnt material overlying a coarse gravel sub-base, grading abruptly into natural clay soils, light reddish brown to gray, intermixed throughout with abundant roots. No unusual odors were noted. The clay is very stiff, relatively dry, blocky in texture, crumbly and highly mottled. No evidence of cured paint residue was found in this pit, except in the roadway material, although there is some reddish coloration to the soils making up the road base material.

TEST PIT NO. 4: Test Pit No. 4 is located approximately 150 feet due east of Test Pit No. 3, oriented in a north-south direction. The test pit was excavated on the north side of the roadway towards the crown of the roadway, and is approximately 7 to 7-1/2 feet deep. Soil profile is similar to Test Pits No. 2 and No. 3. A burnt material is overlying the sub-base, and is approximately 2 to 3 feet thick. The sub-base is 2 to 4 inches thick, grading abruptly into natural light brown clay with some lighter brown clay nodules. No discoloration of soil was noted beneath road base material. Some purplish to reddish discoloration in the

road base material, similar to the cured paint residue previously noted. Cinders and ash are the major components of the road material. Slight burnt odor in ashes noted.

TEST PIT NO. 5: Test Pit No. 5 is on the extreme western edge of the roadway leading from AMCA's property to the rental home, and is approximately 8- 1/2 feet deep. Soil to the bottom of the pit is very dry. Profile from the top of the pit is similar to all other pits described so far along the roadway. The fill material appears a little drier and more granular on the road surface than previously noted. There are abundant roots and rootlets to a depth of approximately 5 feet below the crown. The crown of the road is nearly 3 feet thick, overlying a gravel sub-base approximately 6 inches and grading abruptly to natural soil.

TEST PIT NO. 6: Test Pit No. 6 is approximately 150 feet west of Test Pit No. 5, and is approximately 8 feet deep. The pit was excavated on the south side of the roadway from the crown of the road south. From the crown to the 2 foot depth, there is granular soil material containing abundant glass and broken metal objects. This material overlays a sub-base approximately 2 to 4 inches thick, which grades abruptly into natural clay soil similar to that found in the other test pits excavated on the roadway. Material thins to the south, although not as abruptly as in other test pits. There appears to be some discoloration of soil, reddish to purplish in color. Possible cured paint residue

and cinders, although not as abundant as noted in Test Pits No. 3 and No. 4. The bottom of the pit is relatively dry.

The clays have abundant roots, and fine rootlets to a depth of approximately 4 to 5 feet below land surface. Clays are similar in appearance to that noted in other pits; light brown to gray clay intermixed and highly mottled.

TEST PIT NO. 7: Test Pit No. 7 is approximately 6 feet deep, with a slight organic odor in pit. There appears to be some slight discoloration in the soil directly beneath the gravel sub-base, a darker gray color which grades into the natural light brown/bluish-gray clay. Road base material is approximately 3 feet thick at the crown, grading to several inches on the south side of the roadway. There does not appear to be any other distinguishing soil characteristic. There are some cinders in the road base material similar to those noted previously.

TEST PIT NO. 8: Test Pit No. 8 is located on the east-west road near the "T" intersection and is approximately 8 to 9 feet deep. Surficial soil layer is approximately 1 foot thick. An oily odor was noted. Surficial soils overlie approximately 1 to 2 feet of dark brown granular material.

TEST PIT NO. 9: Test Pit No. 9 is located on the roadway leading to the east-west road. The pit is approximately 8 feet deep.

Surface soils appear relatively clean. About 1 to 2 inches of ballast stone and gravel was noted on the surface, with pieces of broken asphalt. This surface material grades rapidly into natural light brown to gray clay, as seen in all the other test pits. No unusual odors were noted. The clay at the surface is sandy. Roots are abundant down to 2 to 3 feet below land surface. The clay is blocky in texture and breaks in crumbs, and is very stiff.

2.6 INTERPRETATION OF PHASE I DATA

The previous Sections describe the sampling and analytical work conducted as part of the Phase I screening efforts. The laboratory data generated by those screening efforts are summarized on Tables 2.1 through 2.24. From this data, and from the site history, we draw the following conclusions:

1. The high soil cation exchange (SCE) capacity uniformly indicates that there is minimal concern for migration of metals at the site. SCE capacity testing was included as part of the Phase I analytical screening due to the concern over the ability of metals to migrate. The SCE capacity is a measure of the soil's ability to bind metals within the soils matrix by exchanging other available cations, such as sodium and calcium, with the heavier metals. A high SCE capacity as exists at the

subject property indicates the soil's ability to retard the migration of metals.

The State of Illinois has no existing criteria for acceptable residual metal concentrations in soils but one State publication titled, "Design Criteria for Sludge Application on Land," January 1, 1984, gives the minimum SCE capacity for soils which are to be used for the land disposal of sludges. Section 391.420 of that publication shows a preferred SCE lower limit of 5 me/100 gm. A review of the data in Tables 2.5 through 2.24 shows that the soils at the Park Forest site range from 21 to 28 me/100 gm., well above the State minimum. The only significant exception to this is the sludge drying beds where, because of the sand associated with the samples, there is a low SCE capacity. At that sampling location, however, the total metals data shows low metal concentrations which pose no concerns.

The SCE capacity data for all areas other than the sludge drying beds screened in Phase I are above the State's preferred lower limit. In general, the data show the SCE capacity in the upper 2 feet of soils to be in the 8 to 15 me/100 gm range, probably due to the mixture of burnt soils and/or ashes, cinders and clay content found within this layer. The SCE capacity in the 2 to 4 foot soil layer is also at, or higher than that found for the background soils.

Thus, the potential for any significant migration of metals at the Park Forest site is very low.

2. There is no evidence of contamination at the sludge drying beds. Consequently, no further studies need be conducted at that area.

3. The three on-site potable wells show no evidence of contamination. It can be concluded that the deep aquifer located immediately beneath the plant proper is not contaminated and there is no concern with the continued use of these wells for both potable and process water for the plant. The well serving the private, rental home to the north of the main manufacturing plant can continue to do so.

4. The surface waters in the unnamed stream flowing from the marshy area to the north of the main manufacturing building show organic contamination, with the highest concentration at 120 ppb. The organics identified are normally associated with degreasing solvents. No PCB's were found in the surface waters. Metal concentrations appear only in trace amounts.

5. Bottom sediments in the unnamed stream, however, show PCB and organic contamination at the point where the stream leaves the marshy area. Concentrations of both PCB's and organics decrease significantly within a short distance downstream. Total

metal concentrations in the bottom sediment follow the same pattern.

6. The storm water discharge point under the main parking lot shows elevated total metals in the bottom sediments, but no PCB's or volatile organics appear.

7. The Phase I air monitoring shows no detectable organics being released due to hand augering, or from around the plant. Phase II investigations should not include any additional air monitoring.

8. Area B - the small burn area, shows elevated concentrations for copper and zinc, and only a trace of PCB's and organics. Therefore, no additional soil sampling and analytical work at Area B are warranted.

2.7 RECOMMENDATIONS FOR PHASE II

Based on the above conclusions, the Phase II investigations should include the following actions:

1. Water and bottom sediment samples should be taken from the marshy area to the north of the main manufacturing building. These samples should be screened for the same analytical

parameters used in Phase I, plus Total Oil and Grease, using hexane as the extracting solvent.

2. A ground water assessment program should be developed to determine if the uppermost aquifer is contaminated. This program should also determine the direction and rate of ground water flow, and should include the geophysical logging of the three on-site potable water supply wells.

3. Additional soil sampling and analytical work to determine the vertical and horizontal extent of soil contamination should be conducted within Phase II for areas C, D, E, F, and G. This analytical work should be limited to the EP Toxicity metals and to field screening tests for PCB's to delineate soils with PCB's at greater than 50 parts per million (ppm) and those with PCB's at less than 50 ppm.

Parameters for determining the level at which "contamination" by metals exists should be established with IEPA prior to further testing. These parameters should include a consideration of the Cation Exchange Capacity of the soil as an indicator of the likelihood of migration. Neither the IEPA tests nor the Phase I results indicate that aside from the burn areas there has been past systematic disposal or dumping in specific areas. Rather, such contamination as does occur is limited to small areas

separated from one another as may exist at a plant in continuous operation for over 40 years.

4. Additional sampling of both surface waters and bottom sediments of the unnamed stream should be included. Additionally, a stream flow measurement and automatic sampling station at a point further down the stream should be established for monitoring purposes.

5. The analytical screening program utilized in Phase II should include Total Oil and Grease (hexane soluble) to account for the fuel oil odor noted in several soil samples.

SECTION

3

SECTION 3.0

PHASE II: WORK PLAN

3.1 INTRODUCTION

Investigative techniques to be utilized during Phase II studies will be designed to assess the presence of contamination at the site, evaluate the subsurface stratigraphy of the site, determine whether or not a shallow aquifer exists at the site, assess the water quality of that aquifer and determine whether or not contaminants are migrating from the site. The field techniques to be utilized include traditional hydrogeological investigative techniques in addition to geophysical logging of existing wells at the site and a field screening program for PCB's. All of the tasks to be conducted during this Phase II Work Plan will be scheduled so that modifications in subsequent portions of the field effort can readily be made based upon the results from the proceeding task(s).

3.2 CHARACTERIZATION OF CONTAMINANTS

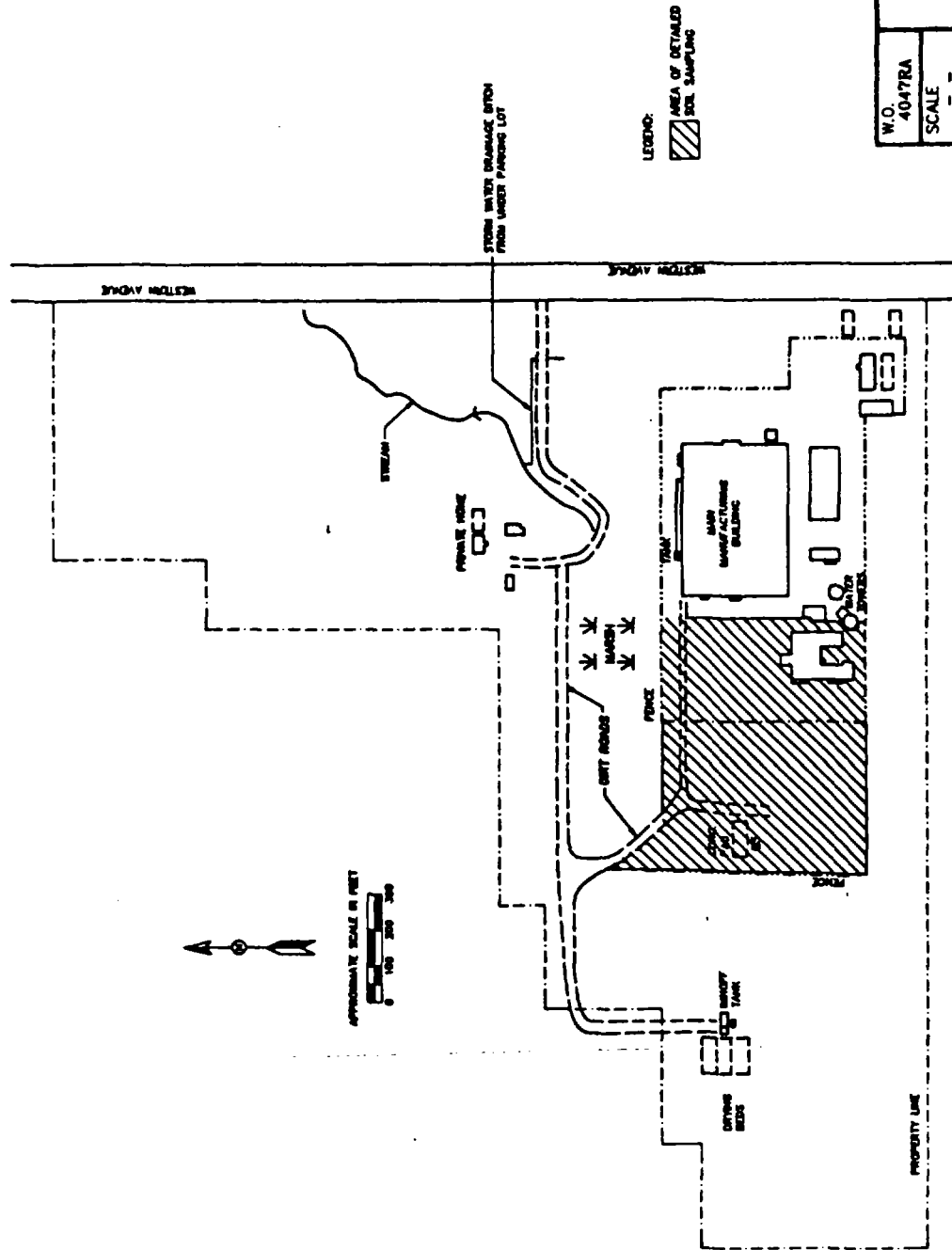
Based on the results of the Phase I investigations, PCB's, heavy metals, and trace levels of volatile organic compounds were detected in some soil samples collected around the site, and in the surface water and bottom sediments from the on-site unnamed stream.

Phase I investigations also identified several areas which do not need further study during Phase II. These areas are the Imhoff tank and associated sludge drying beds, Area B - the small burn area, and the on-site roadways.

Primary objectives for the contaminant characterization during Phase II are:

- o Characterize and quantify any hazardous substances in the soil, ground water, or surface water in select areas of the property.
- o Evaluate the types and quantities of any hazardous substances which might be migrating into the underground aquifer or from the property.
- o Provide adequate data to support an endangerment evaluation and feasibility study.

Soil sampling, limited to EP Toxicity metals and a field screening study to determine the concentration of PCB's, will be used to determine the horizontal and vertical extent of any such contaminants. Phase II soil samples will be obtained in the area as shown on Figure 3-1. A sampling grid of 50 feet will be established within the indicated area. Shallow soil samples will be acquired to a depth of six feet using a split-spoon sampler. Split-spoon samples will be taken every two feet. A composite sample from each split-spoon will be extracted and tested for PCB content using a McGraw-Edison PCB Field Test Kit. This will enable real time analysis for PCB content and will facilitate any changes in the sampling grid which might be prescribed based on the results of the screening. Ten percent of the soil samples collected during this program will be submitted to the laboratory for analytical testing to insure that PCB field screening results are accurate.



W.D.	4047RA	FIGURE NO.	3.1
SCALE	- -	PHASE II SOILS INVESTIGATION AREA	
DATE	10/14/86	ERM	ERM-North Central, Inc.

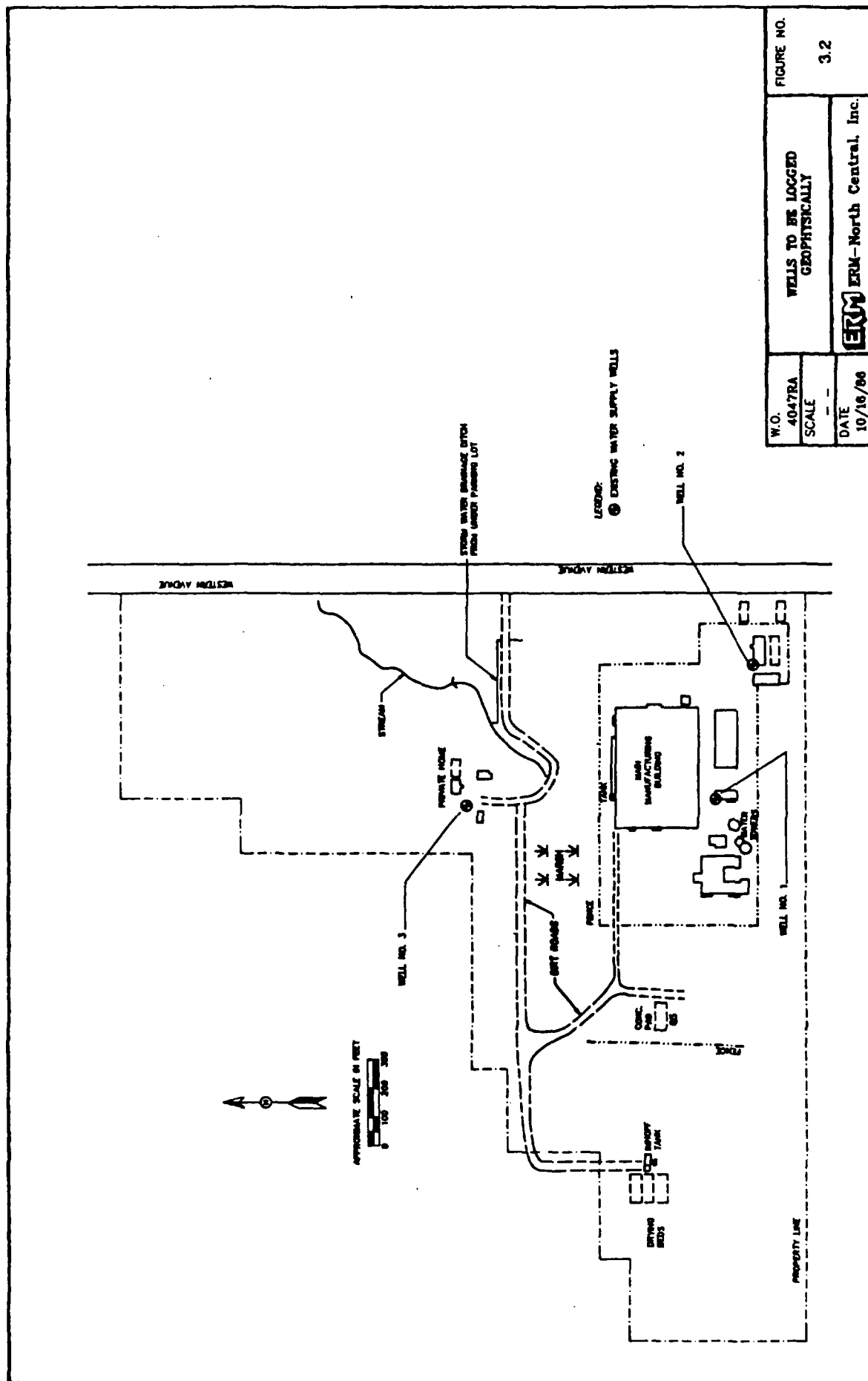
3.3 HYDROGEOLOGICAL INVESTIGATION

There are no monitoring wells at the present time on the Park Forest site. In addition, no geologic logs were found for the process water supply wells for the plant, or for the water supply well for the on-site rental property. Therefore, this portion of the investigation will include geophysical logging of the existing wells at the site (Figure 3.2), soil borings to define the subsurface stratigraphy, monitoring wells constructed to intercept any actual or potential aquifer zones, as well as additional surface water and bottom sediment sampling of the unnamed stream on-site.

As discussed in Section 2.0, plant personnel have reported that one plant well is approximately 240 feet deep and the other is 140 feet deep. Prickett, et. al. (1964) however, reports a well in the area owned by Remington Arms (a former operator of the site) with a total depth of 405 feet. Since the date of this article and the date of Remington ownership of the site coincide, it is likely that one of the plant wells may actually be over 400 feet deep. All on-site wells will therefore be plumbed to determine total depth.

Piskin and Bergstrom, 1976, report the potential for lenses and thin interbeds of water bearing sands and gravel for the area. Further, at some localities in Will County, there is a sand and gravel layer between the bedrock and the overlying glacial till (Schicht, et. al., 1976). Although not suitable for municipal or process water supplies, this unit can support residential wells and is therefore a potential conduit for contaminants.

It is not known whether any of these layers exist beneath the Park Forest site.



W.O.	4047RA	FIGURE NO.	3.2
SCALE	---	WELLS TO BE LOGGED GEOPHYSICALLY	
DATE	10/16/86	ERM-ERM-North Central, Inc.	

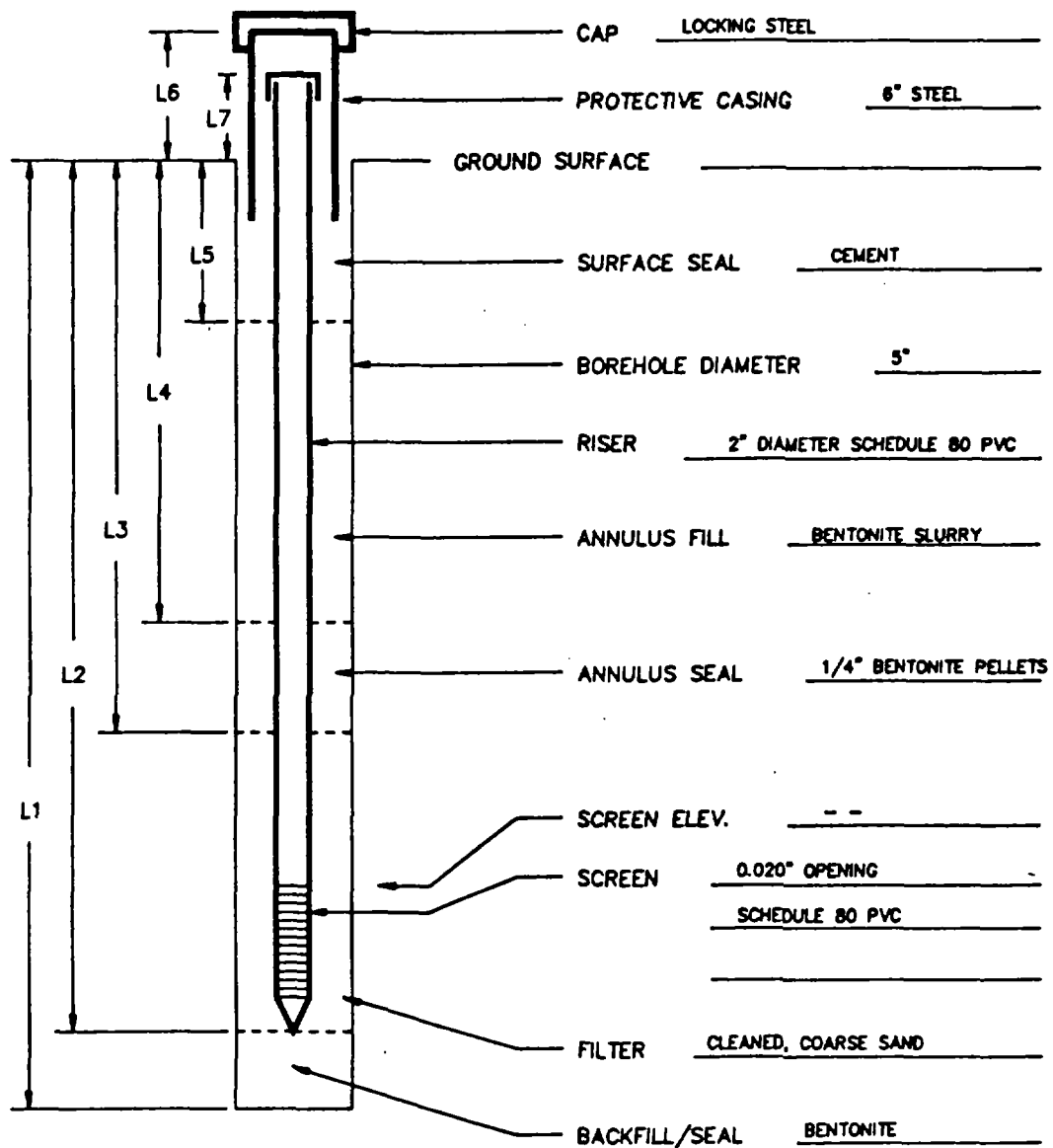
Therefore, in light of this uncertainty, the initial task during drilling activities will be to advance a soil boring using mud rotary drilling techniques to the bedrock surface. Accurate drilling logs will be kept. The location of the first boring (No. 1) will be southwest of the plant to intercept the greatest thickness of unconsolidated materials at the site (Figure 3-3). This will enable a determination of whether or not any near surface aquifers exist in the site area and at what elevation monitoring wells should be installed. If a water bearing/aquifer zone is encountered in this boring, a monitoring well will be constructed in the boring to intercept that zone. If no potential water bearing layers are intercepted, the soil boring will be backfilled with a cement grout.


Boring No. 2 will be a monitoring well installed between the boiler house (Building No. 5) and the underground fuel oil storage tanks located immediately to the south of the building. This monitoring well will be installed to a depth of 10 feet below the bottom of the underground tanks.

Following the initial soil boring, soil borings will be conducted at the other locations on Figure 3.3 in the numerical order shown, to verify the stratigraphy of the site and/or to install ground water monitoring wells at appropriate elevations. If no water bearing strata are intercepted in the initial soil boring No. 1, subsequent soil borings around the marsh and stream area will be extended only to a depth of 20 feet below the base of the marsh. These wells will be sampled at 5 foot intervals for changes in lithology. If no monitoring wells are installed in these borings, the borings will be backfilled with cement grout. Any ground water monitoring wells installed at the site will be constructed as shown on Figure 3-4.

The marsh located to the north of the main manufacturing plant is a surface water feature which receives run-off from the plant

MONITORING WELL CONSTRUCTION



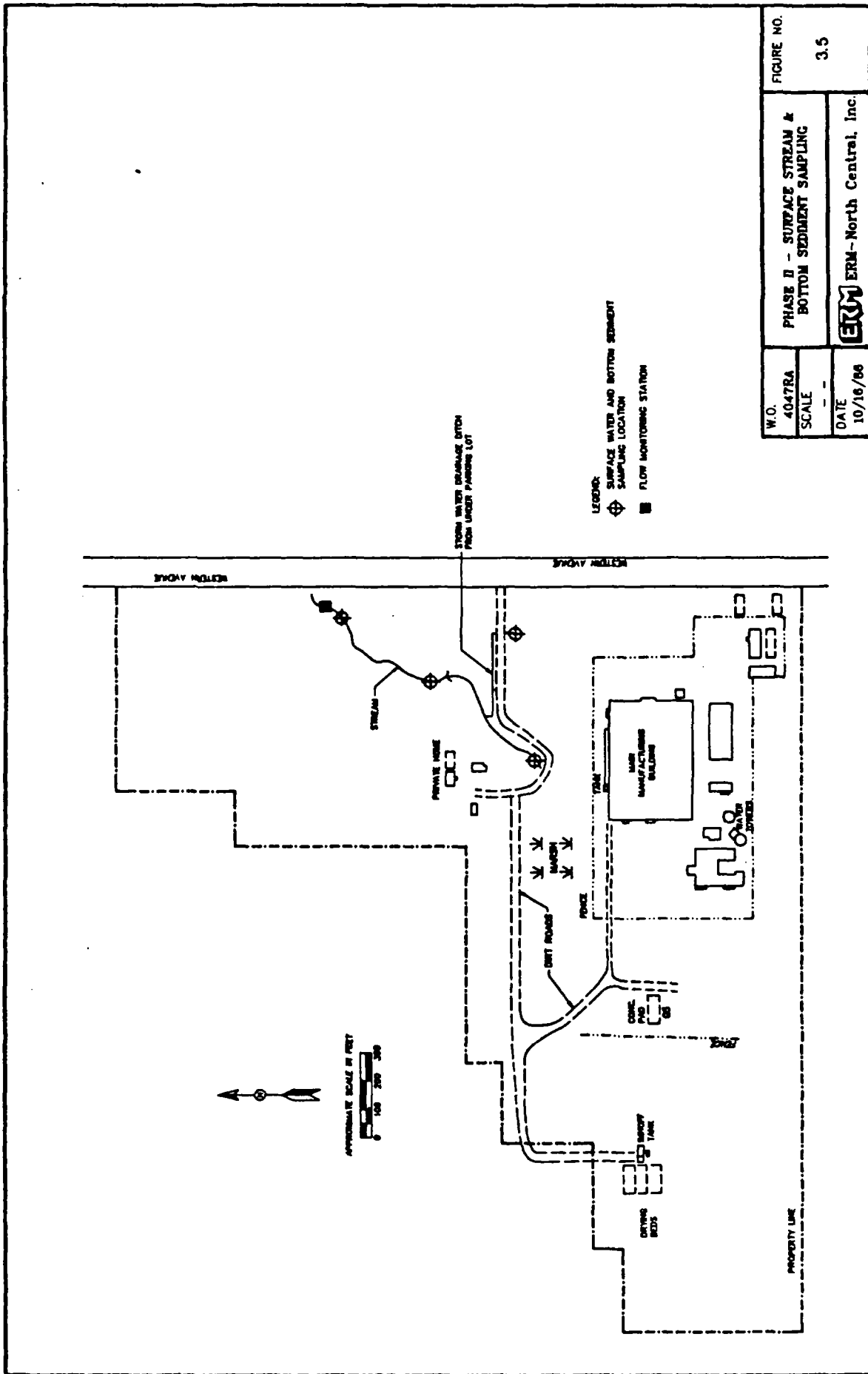
W.O. 4047RA	PROPOSED MONITORING WELL CONSTRUCTION	FIGURE NO. 3.4
SCALE --		
DATE 10/14/88	 ERM-North Central, Inc.	

area and drains to the unnamed stream which flows off-site. The marsh is therefore a potentially impacted surface water body and the stream is a potential transport route from the site. As discussed in earlier portions of this document, it is proposed that both water and sediment samples from the marsh be collected. During the drilling and the remainder of the Phase II site investigations, water samples and bottom sediment samples will be collected from the four locations shown on Figure 3-5.

These samples will be used to document whether contaminants have entered this surface water body and if so, whether those contaminants are migrating off-site at detectable levels. In addition, a water level gauge will be installed at the location indicated on Figure 3-5. Water levels and flow rates will be measured during Phase II sampling episodes and at additional periods during site investigations to characterize the volume of flow through the stream. If contaminants are shown to be migrating off-site, these data will then be necessary input for the endangerment assessment in estimating quantities of material migrating off-site and identifying potential receptors.

3.4 OFF-SITE WELLS

All off-site water supply wells within a three mile radius of the Park Forest site will be cataloged as part of the Phase II studies. Wells will be categorized according to present and/or past usage and the aquifer in which the well is completed. All available geologic data from these well logs will be utilized to develop the regional geologic setting for the site.



W.O.	4047RA	FIGURE NO.	3.5
SCALE	-	PHASE B - SURFACE STREAM & BOTTOM SEDIMENT SAMPLING	
DATE	10/16/86	ERM-North Central, Inc.	

3.5 TENTATIVE SCHEDULE: PERSONNEL AND EQUIPMENT REQUIREMENTS

3.5.1 Tentative Schedule

Office studies, including the cataloging of off-site wells, will begin immediately upon receipt of IEPA approval of this document and IEPA approval of the Phase II Work Plan. Therefore, as soon as weather permits, a detailed site survey will be conducted to locate all cornerposts and survey baselines to be used during the Phase II field investigations.

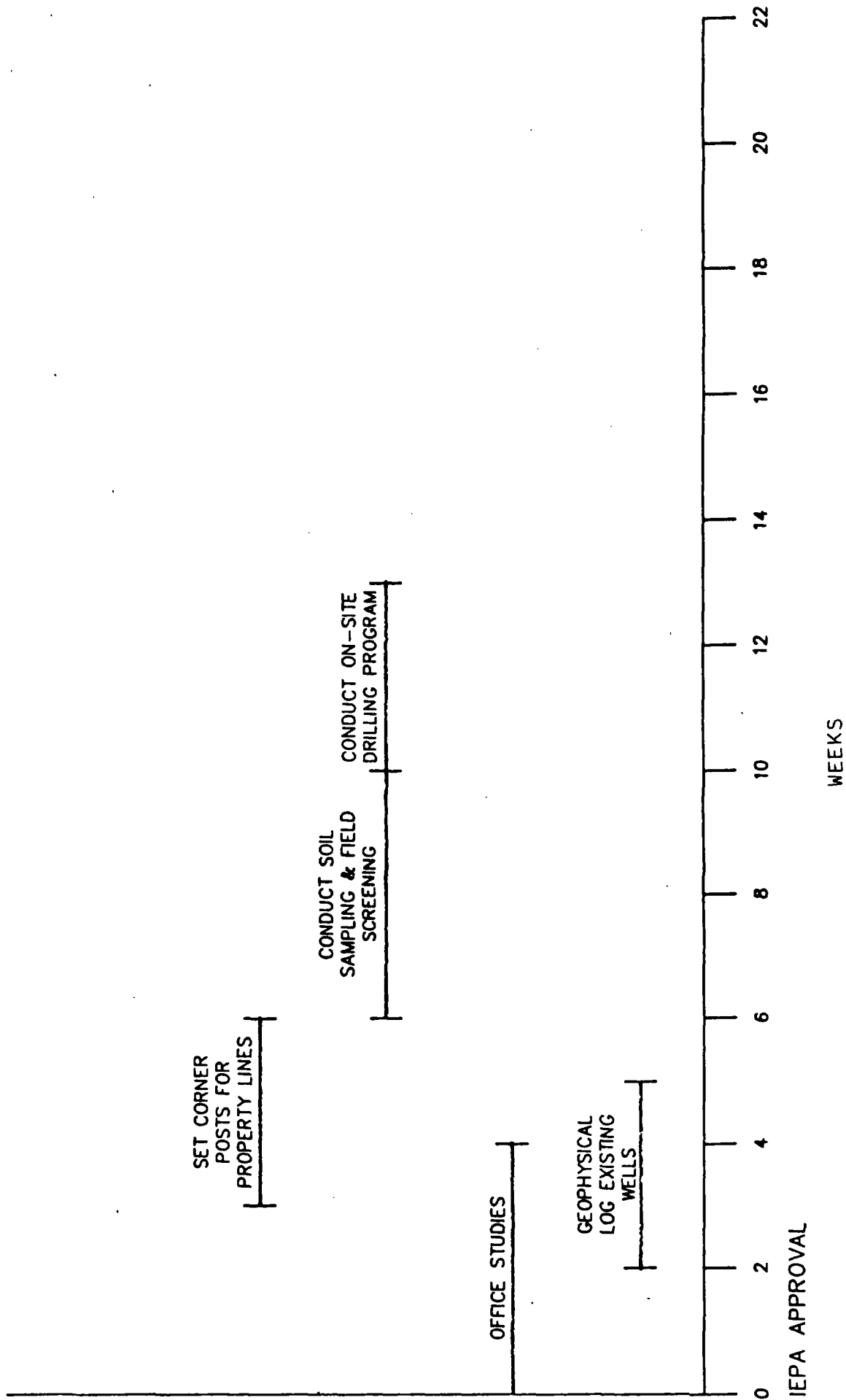
The schedule for initiation of Phase II work activities and the variation of those field activities is shown in Figure 3-6. Ground water sampling from any monitoring wells installed at the site will be collected after all wells are completed. At that time, surface stream and bottom sediment samples will also be acquired.

3.5.2 Personnel

The following personnel and/or organizations have been designated to supervise and conduct work activities for Phase II:

**Environmental Resources Management-North Central, Inc.
Palatine, Illinois**

Project Manager:	James W. Polich, P.E.
Project QA/QC:	Roy O. Ball, Ph.D., P.E.
Project Geologist	John P. Imse



<p>PHASE II WORK PLAN SCHEDULE</p>	FIGURE
	3.6

ERM North Central, Inc.

Drilling Company
Canonie Excavation and Construction

Ben Fox

Laboratory Analytical Work

Gulf Coast Laboratories
University Park, Illinois

3.5.3 Equipment Requirements

The following lists the equipment which will be necessary to conduct Phase II activities:

Sampling Equipment

Grab samplers
Dedicated Bailers
Pumps/Tubing
Sample Containers
Sample Preservatives
Coolers

Analytical Equipment

HNU Photo Ionization Detector
Conductivity Meter
pH Meter
Filtering Apparatus
McGraw-Edison PCB Field Test
Kit
Associated Equipment for
Extracting Samples

Field Equipment

Drill Rig
Drilling Equipment Including
Augers, Split-Spoon Samplers
Casing and Screens

Safety Equipment

Personal Protective Equipment

SECTION 4.0

PHASE II SITE SAMPLING PLAN

4.1 FIELD ACTIVITIES

The Phase II field investigations will consist of ground water sampling, on-site well installation, surface water and bottom sediment sampling, and field testing for PCB's and volatile organics. Site borings and wells will be installed by Canonic Construction with drilling crews having prior experience at hazardous waste facilities. Collection and field screening of samples will be conducted by experienced ERM-North Central geologists and engineers familiar with applicable techniques and equipment. Individual work tasks involved in any sampling will be discussed in this site sampling plan.

4.2 ANALYTICAL QA/QC

All samples shipped off-site for chemical analysis will be subjected to a rigorous QA/QC program based upon the quality assurance guidelines provided in the following publications:

"Handbook for Analytical Quality Control in Water and Wastewater Laboratories," EPA 600/4-79-019, March 1979.

"National Enforcement Investigation Center Policies, and Procedures Manual," EPA 330/9/79/001-R, October 1979.

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," USEPA, SW-846, 2nd Edition, April 1984.

Recommended guidelines for all EPA methods employed in the analytical work.

To monitor analytical laboratory performance, blank and duplicate samples will be submitted with samples collected in the field. The purpose of the field QC samples is to provide data to monitor the accuracy and repeatability of the laboratory analyses. It is believed that the combined field and laboratory QC procedures will provide an adequate data base for evaluation of all analytical data.

The blank samples will consist of moist earth, distilled water, or materials of similar composition as samples. One duplicate and one blank sample will be submitted to the analytical laboratory for every ten water, soil, or sediment samples.

4.3 SOIL SAMPLING AND PCB SCREENING

Shallow soil samples will be collected at a grid spacing of 50 feet over the area shown on Figure 4.1. Samples will be acquired by advancing a split-spoon sampler and collecting continuous samples to a depth of 6 feet. The rig and any auger flights or equipment which come in contact with the samples will be steam-cleaned between each hole. The split-spoon sampler will be steam-cleaned between each sample in each hole. An ERM-North Central geologist will log soil observations/characteristics from each hole.

Two composite samples will be taken from each 24-inch split-spoon sample. One composite will partially fill a clean glass jar and be allowed to equilibrate with either ambient air or inside warm air. The headspace in the sample jar will then be analyzed using a HNU photoionization detector to determine total volatile organic vapor concentration. The second composite for each split-spoon sample will be analyzed in the field using a McGraw-Edison PCB Field Test Kit. Soil samples will be extracted in accordance with test kit specifications and analyzed for PCB

content. A bulletin detailing the operation procedure and specifications for this test kit are included as Appendix C.

To verify accuracy of the field screening procedure, ten percent of the soil samples collected will also be submitted to the analytical laboratory for analysis. Preservation of samples submitted to the laboratory will be in accordance with Table 4-1.

4.4 Ground Water Sampling

Ground water samples will be obtained from all monitoring wells constructed on-site as discussed in Section 3.0. Static water levels will be measured in each well prior to sampling and after sampling. To remove potentially unrepresentative water, stratified fluids, residual chemicals or floodwaters, every well will be purged prior to each sampling event. Purging will consist of the removal of three to five well volumes of water dependent upon stabilization testing consistent with current sampling procedures. Ground water samples would be obtained immediately after purging. Water samples will be obtained and placed in sample bottles with care, causing as little aeration of the sample as possible. Specific conductivity and pH will immediately be determined, and the sample filtered, ambient air temperature permitting, through a 0.45 micron filter. Samples will be preserved after filtering as shown in Table 4-1, and analyzed for the parameters shown in Table 4-2.

The fraction of each sample for volatile analysis will be placed in a 40 ml. vial, filled to the septum, sealed, and checked for air bubbles. If air bubbles are apparent, the process will be repeated until an air-free sample is obtained.

Samples will be collected from the well using dedicated, Teflon bailers. Each bailer volume will be used to place equal portions

TABLE 4.1

SAMPLE VOLUME AND PRESERVATION REQUIREMENTS

<u>PARAMETER</u>	<u>CONTAINER</u>	<u>PRESERVATION</u>
(A) Soil/Sediment:		
PCB's	100g Refrigerated Glass w/ Teflon Lined Cap	4° C
Metals	100g Glass	4° C
Volatile Organics	Two 40ml Glass Vials w/ Teflon Septum	4° C
(B) Water/Liquid:		
PCB	1000ml Amber Glass with Teflon Lined Cap	4° C
Metals	1000ml HD Polyethylene	HNO ₃ to pH <2
Volatile Organics	40ml Glass Vial with Teflon Lined Septum	4° C

TABLE 4.2
GROUND/SURFACE WATER SAMPLE
PARAMETERS

<u>FIELD</u>	<u>LABORATORY</u>
Temperature	Volatile Organic Compounds
pH	Polychlorinated biphenyls
Specific Conductivity	Cyanide
Odor	Arsenic
Odor	Barium
	Cadmium
	Chromium
	Copper
	Lead
	Magnesium
	Mercury
	Molybdenum
	Nickel
	Selenium
	Zinc
	Total Oil & Grease (Hexane Soluble)

of water in the containers for each split sample. The process will be repeated until the containers are full.

All field data will be recorded in a field logbook.

4.4.1 Ground Water Sample Handling and Shipment

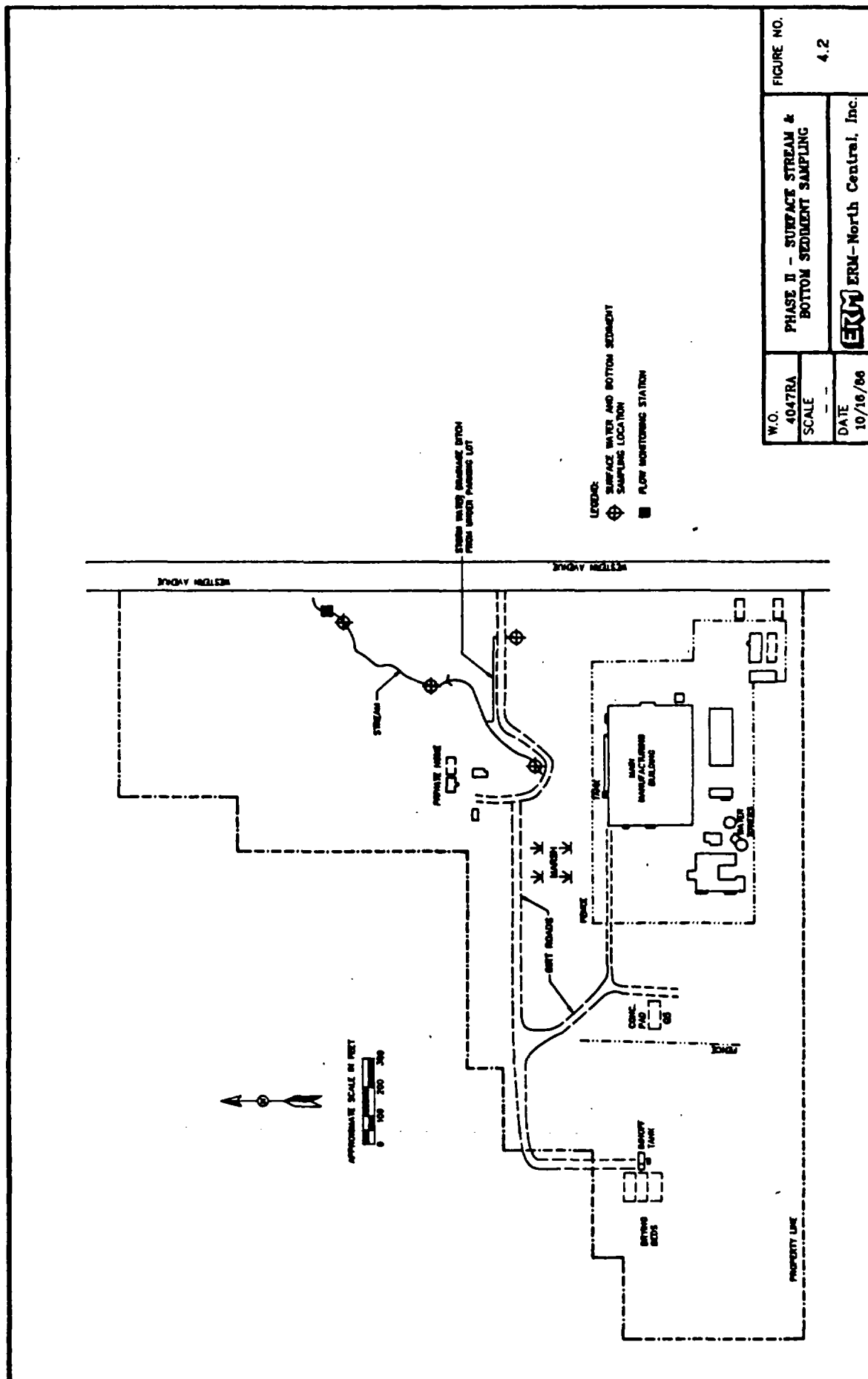
Labels affixed to each sample container will specify the sample number, date, time, preservation techniques and analyses to be performed. The sample containers will be placed in ice chests with cold packs and hand delivered at the end of each day, under chain-of-custody, to Gulf Coast Laboratories, Inc., University Park, Illinois. One chain-of-custody form will be used for each lab pack.

It is anticipated that the sample shuttles will be driven to Gulf Coast Laboratories or transported via messenger service. The analytical laboratory will be contacted prior to each shipment and informed regarding the number of lab packs and method of shipment.

4.5 SURFACE WATER AND BOTTOM SEDIMENT SAMPLING

Surface water will be collected at locations shown on Figure 4.2 using a grab-type sampler. All surface water samples will be monitored for pH, temperature, and specific conductivity in the field. A clean, laboratory prepared and rinsed bottle will be used to collect the water sample.

After collection and field analysis, ambient air temperature permitting, the sample for metals will be filtered and placed in the properly prepared, sized and preserved container. All samples will be chilled to 4°C. Sample containers and preservatives will be as shown on Table 4-1.



Special care will be taken with subsamples to be analyzed for volatile organic compounds. The protocol for these subsamples is the same as that described for ground water sampling.

Stream bottom sediment samples will also be collected at locations shown on Figure 4.2. All of the bottom sediment sample locations will be at the surface water sampling points. An Eckman dredge will be used to obtain samples of the upper 5 cm of sediment. All sediment samples will be monitored in the field for temperature. The dredge will be cleaned and rinsed prior to each sample taken. The sediment samples will be taken after water samples to minimize potential for suspended sediment in the water samples.

Surface water and bottom sediment samples will be analyzed for the parameters in Table 4-2 and 4-3, respectively. Sample handling and shipment procedures will be the same as those for ground water samples.

4.6 SAFETY

All Phase II field activities will be conducted in accordance with the Phase II Project Safety Plan.

4.7 DOCUMENTATION AND REPORTING

Field activities will be recorded daily in the field activities logbook. Sample numbers, sampling date and time and the physical characteristics of the samples will be recorded in the sample logbook. A sample container label and chain-of-custody form is included as Figures 4.3 and 4.4.

TABLE 4.3

BOTTOM SEDIMENT SAMPLES
PHYSICAL/CHEMICAL PARAMETERS

<u>PHYSICAL</u>	<u>CHEMICAL</u>
Odor	Volatile Organic Compounds
Color	Polychlorinated biphenyls
	Cyanide
	Arsenic
	Barium
	Cadmium
	Chromium
	Copper
	Lead
	Magnesium
	Mercury
	Molybdenum
	Nickel
	Selenium
	Zinc
	Total Oil & Grease (Hexane Soluble)

FIGURE 4.3

SAMPLE LABEL

SAMPLE NO. _____
 PROJECT NO. _____
 PERSONNEL _____
 DATE _____ TIME _____
 COMPOSITE _____ GRAB _____
 TYPE: SOIL _____ WATER _____ SLUDGE _____
 OTHER (EXPLAIN) _____

ANALYSIS

PP Volatiles	_____	SO ₄	_____
PP B/N	_____	Cl ⁻	_____
PP Acids	_____	Total CN	_____
PP Pesticides	_____	NO ₃	_____
Metals-Total	_____	pH	_____
Metals-EP Tox.	_____	Spec. Cond.	_____
COD	_____	Hex Cr	_____
TDS	_____	Free Lime	_____
TOH	_____	Other	_____
TOC	_____	Preservatives	_____
CO ₃ HCO ₃	_____		

FIGURE 4.4

CHAIN OF CUSTODY RECORD

Project Name _____ Collector's Sample No. _____

Project Number _____

Site: _____

Location of Sampling: _____

Type of Sample _____

Company's Name _____ Telephone (____) _____

Address _____
number street city state zip

Volume Collected _____ Number of Containers _____

Collector's Name _____ Telephone (____) _____

Signature _____

Date Sampled _____ Time Sampled _____ (am/pm)

Field Information _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Authorization for Disposal: _____ Date/Time: _____

Disposed By: _____ Date/Time: _____

SECTION 5.0

PHASE II PROJECT SAFETY PLAN

5.1 INTRODUCTION

This section presents the safety procedures to be followed during the Phase II Remedial Investigations, and all subsequent work performed on, or adjacent to, the Park Forest property, to protect the health and safety of field personnel.

5.2 GENERAL INFORMATION

The following information is provided to acquaint personnel with the names and responsibilities of designated safety personnel, emergency agency telephone numbers, the nature of potential health and safety hazards, as well as general rules pertaining to activities in the field.

5.3 PROJECT SAFETY OFFICER

The Project Safety Officer (PSO) is responsible for daily supervision of all safety, decontamination and environmental monitoring activities associated with the remedial investigation. The PSO is also charged with assuring that all remedial investigation personnel comply with the provisions of this Plan in the field. The PSO has the authority to stop work in the event of an emergency (or safety plan violation), to start work following any stoppage, and to approve modifications to safety plan requirements based upon field conditions.

5.3.1 Emergency Agencies

A list of emergency telephone numbers is provided below and will be posted at the Site:

1. Illinois Environmental Protection Agency,
Environmental Emergencies Duty Officer (24-hrs)
(217) 782-3637
2. Ambulance - Park Forest Ambulance Service,
(312) 756-5151
3. Fire - Park Forest Fire Department,
(312) 756-5151
4. Police - Park Forest Police Department,
(312) 756-5151
5. Hospital - St. James Hospital, Chicago Heights,
(312) 756-1000

5.3.2 Key Personnel

<u>TITLE</u>	<u>NAME</u>	<u>COMPANY</u>	<u>TELEPHONE</u>
Project Manager	J.W. Polich	ERM	(312) 934-4646
Project Safety Officer	J.P. Imse	ERM	(312) 934-4646
Back-Up Project Safety Officer	E.D. Breland	ERM	(312) 934-4646

5.4 NATURE OF POTENTIAL HAZARDS

5.4.1 Chemical Hazards

The manufacturing operations associated with the property involved large volumes of metals with associated oils and degreasing operations. Previous operations at the plant also involved metal processing including surface preparation (degreasing, cleaning) and final finishing (plating, painting).

Based upon available information, and the results of the Phase I screening, the following potential hazards have been identified as being of concern for investigation personnel:

- o Buried saw blades and other discarded metal objects
- o Buried reactive materials (magnesium chips)
- o Caustic and/or acid contamination of soil and ground water
- o Contamination of soil with heavy metals (paints, paint sludges and plating wastes)
- o Potential exposure to PCB's
- o Exposure to cutting oils and other oils or vapors
- o Puncture of underground piping and tanks
- o Buried electrical utility lines
- o Volatile organics used for degreasing including chlorinated solvents.

However, available information indicates that the hazards presented by the property to remedial investigation personnel are minimal. It should be noted that the above concerns had been identified for the Phase I studies and that throughout the Phase I field efforts, no hazards and/or concerns were identified. The major hazard to personnel is considered to be exposure to soil

and water potentially contaminated with hazardous constituents, of which PCB's are of the most concern. The Phase I study results have shown some volatile organic contamination, but at low concentrations. Furthermore, any reactive materials, as magnesium chips, are believed to have been largely spent primarily due to the high temperatures at which magnesium burns, and that once ignited, the magnesium would burn completely out.

5.4.2 Physical Hazards

There is some risk associated with injury resulting from contact with the equipment and facilities as well as the equipment used during the Phase II investigations. Personnel are cognizant of the fact that any protective apparel worn may limit visibility, hearing and manual dexterity. In addition, if protective equipment is required, (e.g., Tyvek coveralls and respirators) this may place a physical strain on the wearer.

5.4.3 Sample Handling and Analyses

The procedures to be followed for handling and shipping samples, and a description of the project analytical requirements are contained in the Phase II Project Sampling Plan.

5.5 GENERAL WORK PROCEDURES

Industrial operations at the plant are still on-going and all remedial investigation work will be performed during normal working hours. Phase II remedial investigation work will not take place within industrial buildings still in use. Remedial investigation work will take place outside all industrial buildings. Normal plant safety procedures will be observed during all remedial investigation work.

Entry and exit procedures will be those procedures normally used except that the PSO will require investigation workers and other investigation personnel near on-going remedial investigation activities to wear required protective clothing and to observe all necessary safety precautions. All industrial buildings are surrounded by a security fence which does not enclose all the surrounding property owned by DESA; however, entry to the industrial manufacturing area is restricted by security guards who require adequate identification and clearance.

In the event of an accident, exposure to contamination or other emergency, the PSO will stop work and determine the actions to be taken. Remedial investigation personnel working should immediately leave the area (but remain in their protective gear). Injured personnel may be removed from any immediate hazard.

If an evacuation is ordered by the PSO, personnel may be instructed to leave by routes other than those normally used.

No eating, drinking or smoking will be allowed near any remedial investigation area. Investigation personnel will go through decontamination procedures for lunch breaks and will be allowed to eat lunch within existing buildings.

5.6 SAFETY TRAINING

All investigation personnel will be required to attend a training program. The content of this program will include discussions of potential hazards, any required protective equipment, any decontamination procedures (including practice), and the use of monitoring equipment. Field personnel will be required to sign a certificate at the conclusion of the training program.

5.7 ENVIRONMENTAL MONITORING PROGRAM

Based on the analytical results obtained from Phase I, there is little, if any, potential for exposure to volatile organic vapors. Consequently, no ambient air monitoring and/or investigations are required for Phase II.

5.8 COMMUNICATIONS

The plant is equipped with telephone service for both local and long distance calls. This telephone system will be used to request help or back-up equipment in the case of an emergency situation. The security guards have access to both this telephone system and to the plant official with the authority to request outside help. Therefore, the investigation team will be supplied with two-way radios so that the security guards may be contacted at any time from any location.

5.9 REQUIRED PROTECTIVE EQUIPMENT

The type of protective gear required is dependent upon the nature and location of the work performed and the past history and use of that location. Based on the property history and Phase I results, the following level of protection is to be worn for all investigative work:

- o White Tyvek Coverall
- o Neoprene or PVC Work Boots
- o Neoprene or Nitrile Work Gloves
- o Hard Hat
- o Safety Glasses

The PSO has the authority to modify required levels of protection in response to field conditions. The PSO may restrict access as he deems necessary regardless of the protective gear worn.

5.10 DECONTAMINATION PROCEDURES

5.10.1 General Information

Decontamination of equipment and personnel will be performed to extend the useful life of the safety equipment, and to limit the migration of any contaminants both off the property and between work areas.

All drilling equipment and other tools, and all well materials, will be cleaned prior to entry to remove grease, oil, encrusted dirt or other materials. Special attention will be given to the rear portions of drill rigs, auger flights and drill rods (inside and outside), and sampling tools. An inspection of all rigs will be made by the project manager and PSO prior to approving equipment for use.

Water obtained from water production wells on the property will be used for decontamination of equipment and personnel. The Phase I analytical results show that water from these wells will not be contaminated.

5.10.2 Equipment Decontamination

All reusable sampling equipment, auger flights, and any other tools used for intrusive work will be decontaminated between borings. Cleaning will consist of scrubbing to remove encrusted materials followed by a soap-and-water wash and potable water rinse using a high-pressure hot water or steam cleaning unit.

Following decontamination, the clean equipment will be stored on plastic sheeting and/or sawhorses if not immediately reused. This equipment will also be covered with plastic.

At the conclusion of work, all drilling rigs will be thoroughly cleaned using the method previously described.

5.10.3 Personnel Decontamination

Decontamination of investigation personnel will be performed at existing plant facilities. Personnel decontamination will consist primarily of soap-and-water hand washings to remove contaminants, followed by doffing of the gear. Coveralls and gloves will be removed by turning the items inside out. The general sequence of doffing procedures is outlined below. The extent of washing required, or modifications to the sequence, may be specified by the PSO.

Steps in decontamination will be:

1. Wash work gloves and boots;
2. Rinse work gloves and boots;
3. Remove boots and gloves; and
4. Remove Tyvek coverall.

5.10.4 Containerization of Decontamination By-Products

Gloves and coveralls will be changed daily and will be disposed of in a separate plastic bag, sealed, and disposed of with the general plant refuse.

5.10.5 Containerization of Drilling By-Products

Auger cuttings and any drilling fluids generated will be drummed, labelled as a hazardous waste, and disposed of at an approved commercial TSD facility.

All shallow soil residues from the field sampling/analytical program will also be drummed, labelled as a hazardous waste, and disposed of at an approved commercial TSD facility.

5.10.6 Personnel Safety Certification

All personnel are required to sign and date the attached certification prior to working on the property (Attachment 5.1). The document will be retained in the project files.

ATTACHMENT 5.1

PERSONNEL SAFETY CERTIFICATION

Safety Plant Certification

All project personnel are required to make the following certification prior to conducting work at the AMCA Park Forest Property.

I _____ certify that:

1. I have read and understand the Project Safety Plan, and that
2. I will abide by the provisions of the Project Safety Plan.
3. I have attended the Project Safety Training program provided by ERM-North Central.

Signature

Date

SECTION 6.0

PHASE II QUALITY ASSURANCE PLAN

6.1 PROJECT DESCRIPTION

The primary objectives of the Phase II Remedial Investigation at the Park Forest property are:

1. Characterize and quantify any hazardous substances in the soil, ground water, or surface water in select areas of the property.
2. Evaluate the types and quantities of any hazardous substances which might be migrating into the underground aquifer or from the property.
3. Provide adequate data to support an endangerment evaluation and feasibility study.

The Remedial Investigation will be performed by:

**Environmental Resources Management-North Central, Inc.
835 Sterling Avenue
Palatine, IL 60067
(312) 934-4646**

6.2 PROJECT SAMPLING PROGRAM

Table 6.1 is a listing of laboratory analysis for the various samples to be obtained.

6.3 ANALYTICAL PROCEDURES

Laboratory analysis of soil, surface water, bottom sediments, and ground water will be performed by Gulf Coast Laboratories, Inc. (Gulf Coast), Park Forest, Illinois. The laboratory has an extensive QA program. The existing quality assurance protocol of Gulf Coast is based upon the following government guidelines:

"Handbook for Analytical Quality Control in Water and Wastewater Laboratories," EPA-600/4-79-019, March 1979;

National Enforcement Investigation Center Policies, and Procedures Manual, EPA-330/9/79/001-R, October 1979;

The recommended guidelines for EPA Method 624 and 625. (Federal Register, December 3, 1979, pp. 69532-69559);

Samples will be preserved in accordance with those procedures established in Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983. Volatile organic samples will be preserved with sodium thiosulfate, and cyanide samples will be

TABLE 6.1

LABORATORY ANALYTICAL PROGRAM

<u>PARAMETER</u>	<u>SOIL</u>	<u>SURFACE WATER</u>	<u>STREAM SEDIMENT</u>	<u>GROUND WATER</u>
Temperature		X		X
pH	X	X	X	X
Specific Conductivity		X		X
Volatile Organic Compounds		X	X	X
Polychlorinated Biphenyls	X	X	X	X
Cyanide	X	X	X	X
Arsenic	X	X	X	X
Barium	X	X	X	X
Cadmium	X	X	X	X
Chromium	X	X	X	X
Copper		X	X	X
Lead	X	X	X	X
Magnesium		X	X	X
Mercury		X	X	X
Molybdenum		X	X	X
Nickel		X	X	X
Selenium	X	X	X	X
Zinc		X	X	X
Total Oil & Grease (hexane soluble)	X	X	X	X

preserved with sodium hydroxide. In addition, all samples will be preserved at 4°C and delivered to Gulf Coast no later than the morning after they are collected.

To monitor analytical laboratory performance, blank and replicate samples will be submitted with the samples collected in the field. The purpose of the field quality control samples is to provide additional data to monitor the accuracy and repeatability of the laboratory analyses. It is believed that the combined laboratory and field quality assurance procedures will provide an adequate base for the evaluation of analytical data.

For soil samples, one replicate sample will be submitted to the analytical laboratory for every ten soil samples.

For surface water and ground water samples, the blank samples will consist of distilled water. One quality control sample will be submitted to the analytical for every ten potable, surface or ground water samples.

6.4 PROJECT ORGANIZATION AND RESPONSIBILITY

6.4.1 Sampling Quality Control

ERM-North Central. Responsibilities will include maintenance of chain-of-custody on all samples collected, verification with

sampling team personnel of sampling techniques and quality control procedures prior to field activities. Responsible for prompt review of any quality control deviation utilized in the field.

6.4.2 Laboratory Quality Control

Gulf Coast. Responsibilities will include supervision of sample analyses of soil, potable, surface and ground water. Responsible for quality control procedures and quality control checks at Gulf Coast.

6.4.3 Data Analysis and Quality Control

Roy O. Ball, Ph.D., P.E., ERM-North Central. Responsible for all data review, validation and interpretation involved in this project.

6.4.4 Overall Quality Assurance

Roy O. Ball, Ph.D., P.E., ERM-North Central. Responsible for implementing the Quality Assurance Plan for this project.

6.5 DATA QUALITY REQUIREMENTS AND ASSESSMENTS

6.5.1 Data Representativeness

When sampled, monitoring wells will have three to five well volumes removed prior to collecting a sample to ensure that a representative sample has been obtained from the aquifer. Subsurface soil samples will be obtained from vertical depths in the soil column. As such, these samples will be representative of subsurface conditions. Each surface soil sample will be composited from a 24-inch split-spoon sample. Surface water samples will be obtained using a grab-type sampler. The sample will be representative of surface water conditions.

6.5.2 Data Comparability

All aqueous sample data will be reported in ug/l (ppb). All soil samples will be reported in terms of mg/kg (ppm). Sampling protocol will be strictly adhered to.

6.5.3 Data Completeness

Less than 100 percent of the samples may be collected due to well accessibility problems and poor recovery of soils in split spoon samplers. The valid data required from the laboratory will be 90 percent of the samples submitted.

6.6 SAMPLING PROCEDURES

Sampling procedures are provided in the Phase II Project Sampling Plan.

6.7 SAMPLE CUSTODY PROCEDURES

Sampling team personnel will perform all sampling and will retain custody until transportation to the laboratory. For all samples, a chain-of-custody form (Figure 6.1) will be used for each sample transportation container.

The field activities will be recorded daily in the field activities logbook. An outline of the requirements for field logbook entries is given in the Phase II Project Sampling Plan. The following information will be recorded in the sample logbook:

1. Exact sample location; tied to fixed objects with steel measuring tape, and photographs.
2. Name of sampler and witness.
3. Date and time of sample collection.
4. Sample number.

5. All sampling conditions, i.e., type of material, weather, type of sampling container and preparation, description of sampling procedure, preservation, and shipping.
6. Field measurements of pH, temperature, salinity, specific conductance, and volume and characteristics of water removed during the development and flushing of wells.
7. Visual observations, as color, odor or any other unusual appearance.

Gulf Coast will provide all sample containers necessary for field sampling and QC requirements. Each lot of sample containers will be checked for cleanliness by the laboratory and closed to prevent contamination. Following sampling, each container will be labeled to indicate sample number, location, time and date, the analyses to be performed on the sample and packaged to prevent breakage. Travel blanks, custody seals, etc. will be added as required by the analytical procedures.

During the field studies, samples are received at the laboratory by the sample custodian who examines each sample to ensure that it is the expected sample, inspects the sample containers for

possible damage, and ensures that the documentation is complete and adequate. The sample custodian will ensure that each sample has been preserved in the manner required by the particular test to be conducted and stored according to the correct procedure. Preservation and storage will require maintenance of 4°C until analysis begins.

6.8 CALIBRATION PROCEDURES AND PREVENTIVE MAINTENANCE

A maintenance, calibration, and operation program will be implemented to ensure routine calibration and maintenance will be performed on all field instruments. The program will be administered by the Project Safety Officer (PSO). The PSO will perform any scheduled monthly and annual calibration and maintenance and will perform field calibrations, checks and instrument maintenance prior to use.

Team members will be familiar with the field calibration, operation, and maintenance of the equipment, maintain such proficiency, and will perform the prescribed field operating procedures outlined in the Operation and Field Manuals, accompanying the respective instruments, and keep a record of all field instrument calibrations and field checks in the field logbook. If monitoring equipment should fail, the PSO will be contacted immediately. He will either provide replacement equipment or have the malfunction repaired immediately.

FIGURE 6.1

CHAIN OF CUSTODY RECORD

Project Name _____ Collector's Sample No. _____

Project Number _____

Site: _____

Location of Sampling: _____

Type of Sample _____

Company's Name _____ Telephone () _____

Address _____
number street city state zip

Volume Collected _____ Number of Containers _____

Collector's Name _____ Telephone () _____

Signature _____

Date Sampled _____ Time Sampled _____ (am/pm)

Field Information _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Authorization for Disposal _____ Date/Time: _____

Disposed By: _____ Date/Time: _____

6.9 DOCUMENTATION, DATA VALIDATION AND REPORTING

6.9.1 Documentation

Lab sheets, sample labels, and/or field notebooks will carry the following information pertaining to sample I.D.:

1. Sample Identification Number
2. Project Identification Code
3. Sample Location Code
4. Date and Time of Sample Collection
5. Initials of Person Collecting the Sample
6. Analyses to be Performed
7. Field Observations, as odor and other visual characteristics

All field data will be entered into notebooks. Field and notebooks, chain-of-custody forms, field data sheets, and lab reports will be filed and stored at ERM-North Central offices.

6.9.2 Data Validation

The precision of the laboratory data will be checked by comparison of the analytical results with the QC samples. The validity of the ground water and surface water data will also be

assessed by comparison of blanks, replicates, and upgradient samples with downgradient and on-site samples. If priority pollutants are detected in the blanks, the priority pollutant data will be invalidated.

The laboratory will critique its own analytical program by the use of spiked addition recoveries, established detection limits for each matrix, precision and accuracy control charts, and by keeping accurate records of the calibration of instruments. Gulf Coast establishes average recoveries for surrogates over time, standard deviations, control and warning limits. When a sample recovery is outside the control limit, the sample analysis is repeated. If upon repetition the sample recovery is outside the control limits, the sample will be deemed unsuitable for the method and no further analysis will be conducted on the sample.

6.9.3 Reporting

Data will be reported in the Phase II Remedial Investigation Report prepared by ERM-North Central.

6.10 PERFORMANCE AND CORRECTIVE ACTIONS

Corrective actions for laboratory analyses will be handled by consultation between the Laboratory Quality Assurance Officer and the Project Manager. The Project Manager will make immediate

decision with the Laboratory Quality Assurance Officer on new protocols to be followed. All changes in laboratory procedures will be documented and reported in the final report.

Corrective action on a day-to-day basis for field sampling will be handled by consultation between the team members and the Project Manager. The Project Manager will make immediate decisions with the team members on new protocols to be followed. All changes in field sampling procedures will be documented in the field logbook and reported in the final report.

6.11 QUALITY ASSURANCE REPORTS

A Quality Assurance Report will be issued by ERM-North Central as part of the Phase II Remedial Investigation Report. The report will include the results of the performance and document audits and any necessary corrective action procedures. In addition, a data quality assessment will be incorporated into the final report.

Environmental Resources Management - North Central, Inc.

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Park Forest / Desa
Superfund / Tech Repts



REMEDIAL INVESTIGATION PROGRAM
FOR
DESA INDUSTRIES
PARK FOREST, IL

PHASE I FINAL REPORT
APPENDICES
VOLUME II

NOVEMBER 4, 1986

PREPARED BY:

ENVIRONMENTAL RESOURCES MANAGEMENT-NORTH CENTRAL, INC.
835 STERLING AVENUE
PALATINE, IL 60067

PROJECT NO. 4047RA

APPENDIX A
PHASE I WORK PLAN

REMEDIAL INVESTIGATION PROGRAM
FOR
AMCA INTERNATIONAL CORPORATION
Park Forest, IL

April 4, 1985

Prepared By:

Environmental Resources Management-North Central, Inc.
835 Sterling Avenue
Palatine, IL 60067

Project No. 4047RA

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SECTION 1

INTRODUCTION

1.0 DESCRIPTION

The property currently occupied by Continental/Midland covers 85.4 acres at 21000 Western Avenue, Park Forest, Illinois, approximately 16 miles south of Chicago. Operations at the current Continental/Midland plant began for the first time in late 1946 or 1947 by which time two Quonset huts and a maintenance building had been constructed. Prior to the erection of these buildings, no known manufacturing operations, or any other operations, are known to have occurred on the property. The best available information is that the entire area was farmland.

No manufacturing operation or activity is known to have been carried out in any area other than that bounded on the north and south by the fences on the current property, the east by Western Avenue, and to the rear by the dirt road just to the east of the concrete pad on which a Quonset hut (Q5) stood. There are only two slight exceptions: from 1950 until 1976 an Imhoff wastewater treatment plant was in operation to the rear (west) of the property, and there was a magnesium burn pile between the Imhoff plant and the plant proper.

The buildings at the Park Forest plant were constructed according to the schedule given in Appendix A. Recent work has included paving over part of the back lot where semi-trailer trucks turn and load, as well as erecting a metal building attachment to Building No. 7.

The basic manufacturing processes used at Park Forest were established by the Mall Tool Company in 1946 and have not varied since. Essentially, the products manufactured at the plant have required the cutting, grinding, degreasing, plating and painting of metal tools and products. A list of the goods manufactured, and the labels under which they were sold, appears in Appendix B. Under Mall Tool (1945-1956), Remington Arms (1956-1969), DESA Industries (1969-1975) and AMCA (1975-present), the products lines were all but identical, as can be seen in Appendix B. Recently, however, the Park Forest plant has been producing powder actuated tools almost exclusively.

A list of these manufacturing processes used at the Continental/Midland plant has been compiled based upon the records of the products manufactured and interviews with plant personnel. This list is contained in Appendix C. Because so many of the products produced under different owners involved using the same processes, no attempt is made to distinguish between those operations which continued or those which were discontinued briefly only to be started again. No plating is currently done on the premises. According to the best recollection of manufacturing, maintenance, and other personnel, Appendix C includes all processes carried out at Park Forest from 1946 to the present. Several of the interviewed personnel have been employed at the plant for over 30 years.

1.1 Study Objectives

The primary objectives of the Remedial Investigation of the Park Forest property are to: 1) identify materials and wastes which may remain on the property, 2) physically and

chemically characterize any of those materials which could potentially be released to the soil or ground water system, 3) estimate the approximate quantities of materials which may have been released, 4) evaluate any types and quantities of materials which may migrate from the property, 5) assess the possible effects of any such migration on potential receptors, and 6) provide adequate data to support any risk evaluation or feasibility study which may be needed.

To meet these objectives, four plans have been formulated: 1) a Remedial Investigation Work Plan; 2) a Project Sampling Plan; 3) a Project Safety Plan; and, 4) a Quality Assurance Plan. These are included as Sections 2, 3, 4 and 5 respectively, to this document. An overview of each plan follows.

1.1.1 Remedial Investigation Work Plan

The Remedial Investigation Work Plan describes the approach and procedures necessary to perform a risk-based remedial investigation at the Park Forest property. The nine primary components of the investigation are discussed: 1) plan development; 2) mobilization; 3) three dimensional characterization; 4) ground water monitoring well installation; 5) water quality sampling of water production wells; 6) data analysis and interpretation; and, 7) preparation of a Remedial Investigation Report.

1.1.2 Project Sampling Plan

The Project Sampling Plan briefly presents the history of operations at the plant, reviews previous agency investigations and analyses, and addresses work activities

required to meet the objectives of the Remedial Investigation Work Plan. Anticipated activities covered in detail include: 1) surface geophysical surveys; 2) surficial soil back-hoe test pit investigations; 3) the subsurface boring program; 4) analytical requirements for soil and ground water samples; 5) surface soil sampling; 6) ground water sampling; 7) surface water sampling, 8) analytical requirements for various samples; 9) decontamination procedures; and, 10) documentation and reporting.

1.1.3 Project Safety Plan

Topics addressed by the Project Safety Plan are: 1) the duties of safety personnel; 2) emergency services and contacts; 3) the nature of potential hazards; 4) work schedules; 5) entry restrictions; 6) facilities; 7) environmental monitoring and equipment; 8) required protective equipment, including the level of protection; and 9) decontamination procedures for personnel, equipment, and by-products.

1.1.4 Quality Assurance Plan

The Quality Assurance Plan presents the policies, organization, objectives, functional activities, and specific quality assurance/quality control activities designed to achieve the data quality goals of the project.

The following are discussed in the Quality Assurance Plan: 1) project scope; 2) project sampling program; 3) analytical procedures; 4) project organization and responsibilities; 5) data quality requirements and assessments; 6) sample custody

procedures; 7) calibration procedures and preventative maintenance; 8) documentation, data validation, and reporting; 9) performance and systems audits; and, 10) quality assurance reports.

SECTION 2

WORK PLAN

2.0 INTRODUCTION

This Remedial Investigation Work Plan describes the proposed approach and procedures to perform a Remedial Investigation at the property owned by DESA Industries, Inc., and operated currently by Continental/Midland. The property is located at 25000 South Western Avenue, Park Forest, Illinois (Figure 2-1). The goals of the Remedial Investigation are (1) to identify and characterize the source and distribution of chemicals and chemical constituents at, or emanating from, the property, and (2) to gather sufficient data and information as a first step to determine the necessity for, and extent of, remedial action at the property. Such remedial action as may prove necessary will be done in accordance with Section 300.69 (f) of the National Contingency Plan, 47 Federal Register, page 31217 (July 16, 1982).

This work plan is designed to be a Remedial Investigation adequate to conduct a Feasibility Study through conceptual design and to provide data to characterize any sources, evaluate pathways, and to monitor the potential receptors of materials on the property. The data collected in the Remedial Investigation should be adequate to conduct a Risk Assessment analysis.

The Illinois Environmental Protection Agency (IEPA) and the United States Environmental Protection Agency (USEPA)

[collectively called "the agencies"] will have access to data generated by the study, and meetings will be held on an as needed basis between representatives of AMCA International Corporation, the parent corporation of DESA and Continental/Midland and the agencies to facilitate the transfer of data. The investigation will be funded by DESA.

The principle components of the investigation are as follows:

- (1) Plan Development
- (2) Project Mobilization
- (3) Project Characterization
- (4) Surface Soil Evaluation
- (5) Ground Water Monitor Well Installation
- (6) Well Sampling Procedures and Ground Water Monitoring
- (7) Surface Water Monitoring
- (8) Data Analysis and Interpretation
- (9) Remedial Investigation Report

The methodologies for each of the principle components of the investigation are presented in subsequent sections of this work plan.

2.1 Plan Development

Sampling, safety, and quality assurance plan will be prepared prior to the initiation of field work. Descriptions of the plans are provided below:

2.1.1 Project Sampling Plan

A Project Sampling Plan will be prepared in accordance with the Remedial Investigation Work Plan. The Project Sampling Plan will outline the objectives of the field investigation, designate sample locations, numbers, sampling methodology and quality assurance requirements for field instrumentation, identify sample compositing, splitting, preservation, handling, shipment, documentation procedures, and will identify key project personnel. All samples obtained during the investigation will be sent to Rocky Mountain Analytical Laboratory, Arvada, Colorado, for analysis of the parameters identified in the Sampling Plan.

Should any other party have tests or analyses performed which are additional to those identified in the Project Sampling Plan, the costs of such additional tests or analyses shall be borne by that party.

It is anticipated that sampling will initially consist of an overall evaluation (Phase I) based on intensive shallow soil borings, backhoe pits, soil sampling, production well sampling, surface water sampling, and stream sediment sampling. None of the soil borings or pits will extend to a depth of greater than 15 feet. Additionally, non-fuel underground tanks and associated piping will be checked for leakage through a leakage test that detects leaks as small as .05 gallons per hour, and conforms with the standards of NFPA 329-1983. Those tests will be performed by an experienced tank testing contractor.

If shallow soil samples indicate significant amounts of hazardous constituent migration, and a high potential for

ground water contamination, the evaluation will enter Phase II. Phase II will consist of soil borings and ground water monitor well installations to a depth of greater than 15 feet. These borings and well installations will provide additional information on stratigraphy, ground water quality, and chemical transport pathways and extent.

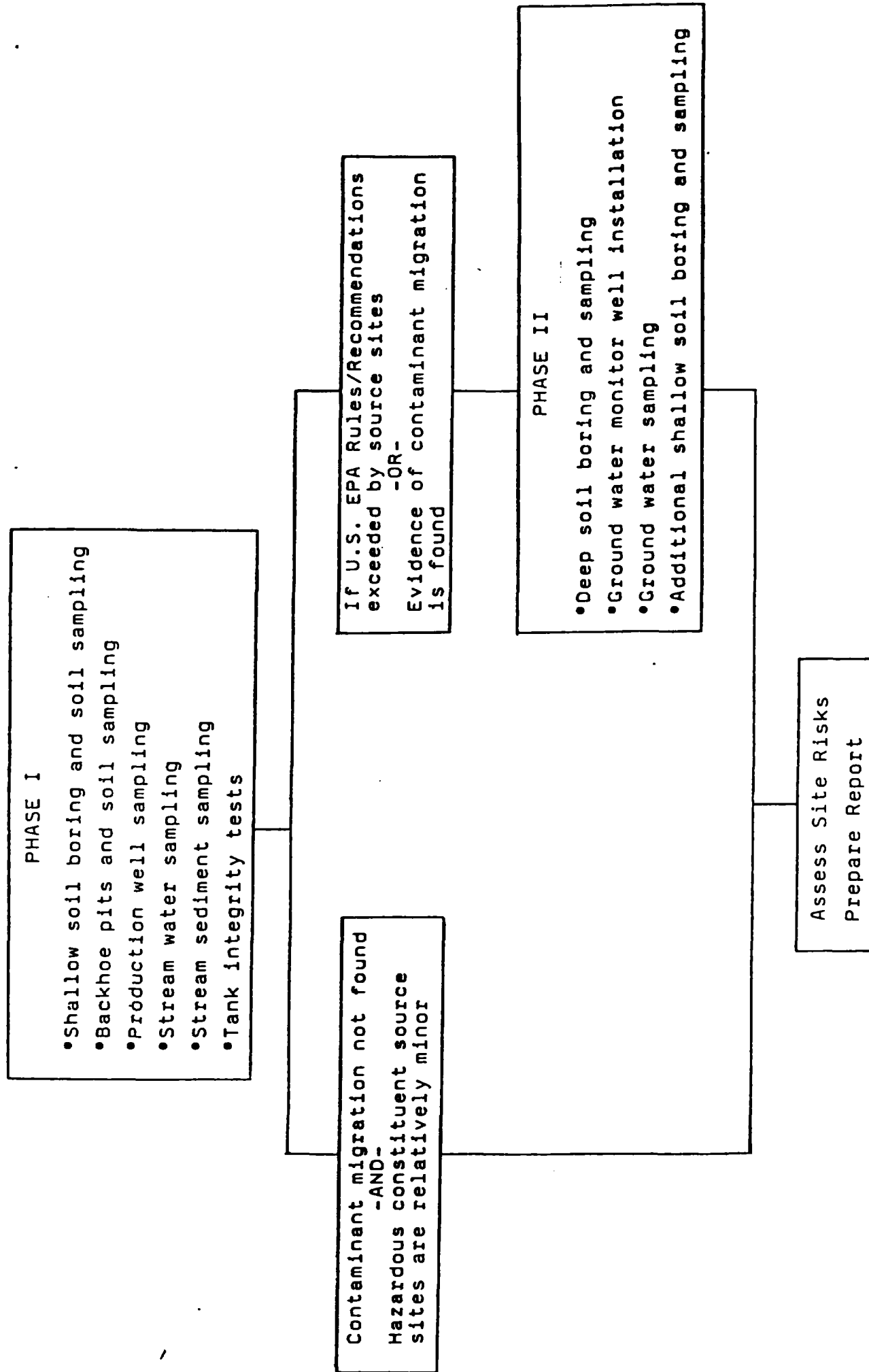
The flow chart shown in Figure 2-2 graphically presents the study methodology.

Designated soil and water samples will be analyzed for pH, priority pollutant volatiles, polychlorinated biphenyls (PCB's) and heavy metals in the laboratory. All water quality samples collected will be field analyzed for pH, temperature, and specific conductance.

2.1.2 Project Safety Plan

A Project Safety Plan will be prepared for use by project personnel and subcontractors. The Project Safety Plan will include required levels of protective apparel, an assessment of respiratory and physical hazards, required safety equipment, safety requirements peculiar to the property, emergency procedures, addresses or phone numbers of local emergency services (hospital, ambulance, fire, police, poison center), and guidelines for a personnel training program. A Project Safety Officer will be assigned to the project.

FIGURE 2-2
FLOW CHART



2.1.3 Quality Assurance Plan

A Quality Assurance Plan will be developed for the investigation. The Quality Assurance Plan will present the policies, organization, objectives, functional activities, and specific activities designed to achieve the data quality goals of the project. The Quality Assurance Plan will include: a project description; project organization and responsibility; objectives for data measurement in terms of precision, accuracy and completeness; sampling procedures; sample custody; calibration procedures and frequency; analytical procedures; data reduction; data validation and reporting; and internal quality control checks and their frequency.

2.2 Project Mobilization

Before subsurface investigations start, the location of buried utilities which may interfere with subsurface exploration will be determined.

Prior to, and during the work, an ambient air monitoring program using various air sensors will be established to: (1) develop the level of existing volatile organic emissions, as indicated by the sensors; (2) determine if any changes to the baseline occurs during field work, and (3) determine if any changes from the baseline can be detected at specific borehole locations or areas of suspected contamination.

2.3 Project Characterization

The purpose of the project characterization component of the investigation is to obtain additional data regarding the

quantity and characteristics of any materials which may have been disposed on the property as a result of past operations. The field investigation will be divided into three components; a data survey, a boring and excavation program, and surface and ground water quality sampling programs.

It is understood that different companies have owned the Park Forest manufacturing facilities and that a number of manufacturing operations have been carried out on the property. These past operations may have included disposal of a portion, or all of the wastes at various locations on the property.

2.3.1 Data Survey

Long-term employees at the plant will be interviewed and additional data collected regarding past practices and operations conducted at the plant. Historical aerial photographs of the property will be studied to identify potential areas of contamination or environmental concern. Information will be requested on observations of disposal practices and other indications of material release or disposal.

Data on the local hydrogeology will be collected from the state geological and water surveys, the United States Geological Survey, the Soil Conservation Service, the United States Geological Survey, local drillers, and any nearby U.S. EPA Superfund reports.

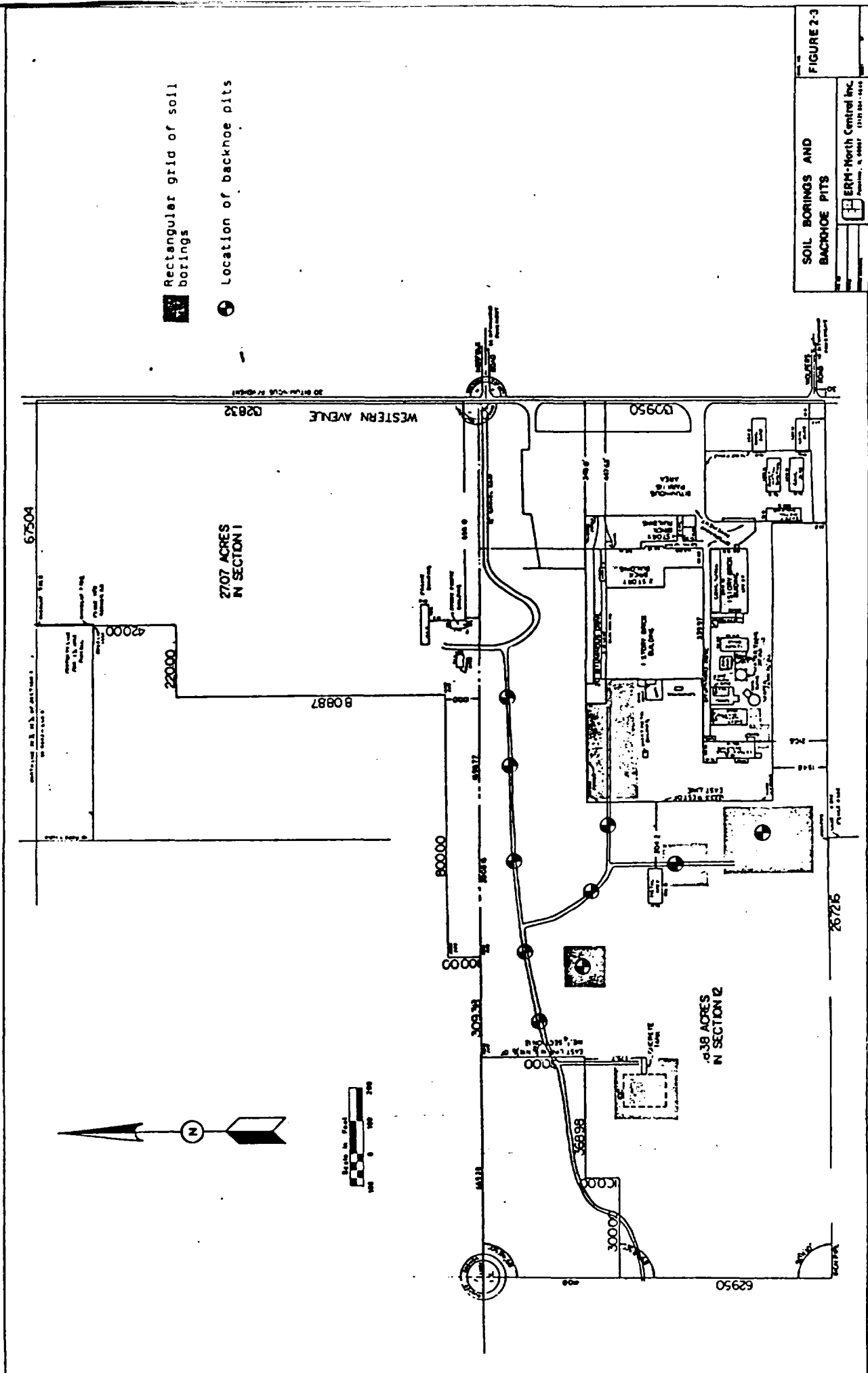
2.3.2 Subsurface Investigation (Phase I)

The purpose of the Phase I subsurface investigation is to identify the characteristics of the local soils determine areas that may have been used or subject to disposal operations, collect soil and ground water samples for laboratory analysis, and determine the potential routes of contaminant movement.

The subsurface investigation will consist of hand auger borings and backhoe pits. Hand auger borings will penetrate to a maximum depth of four feet, whereas backhoe pits may penetrate to a maximum depth of fifteen feet or to the shallow water table. This boring program will provide information regarding the horization, thickness, continuity and distribution of the unsaturated surface soils and any possible contamination over the property.

Currently, it is anticipated that soil borings and backhoe pits will be as located on Figure 2-3. The subsurface investigation may be expanded or reduced based on review of past practices, aerial photographs, and the development of investigative activities.

Any fluids and solids which are generated during the investigation will be redeposited at the point of generation. If subsequent analytical results indicate that these materials would be classified as a hazardous waste, all such materials generated after that time would be disposed of at an approved facility.



2.3.2.1 Shallow Boring Program

Shallow borings will be located based on data obtained from aerial photographs and employee interviews. The borings will be located so as to identify possible pathways and rates of potential contaminant migration in the soil. Borings will be located to maximize the possibility of finding non-native materials or migration pathways. The data obtained from the initial subsurface investigation will be carefully reviewed and will provide, along with the geophysical surveys, the basis for locating additional shallow borings, deep borings, and ground water monitoring wells, as appropriate.

Field soil samples collected for physical and chemical analysis will be labeled, sealed, and placed on ice until analyzed. All samples will be maintained under chain-of-custody protocol through shipment to the analytical laboratory, within one week of collection, for analysis of the parameters listed in Table 2.1. Samples will be considered "unanalyzed samples of hazardous wastes from other than closed containers" for shipping purposes. All applicable DOT shipping regulations will be strictly adhered to.

2.3.2.2 Backhoe Pit Program

Backhoe pits will be located based on data obtained from aerial photographs and employee interviews. The backhoe pits will be located to allow visual inspection of soil profiles over an area as well as to allow the collection of soil samples from very specific locations within the soil profile. The pits will also permit a determination of the

TABLE 2.1

SOIL SAMPLE
PHYSICAL/CHEMICAL PARAMETERS

<u>Physical</u>	<u>Chemical</u>
Unified Soil Classification	Volatile Organic Compounds
Permeability	Polychlorinated Biphenyls
	Cyanide
	Arsenic
	Barium
	Cadmium
	Chromium
	Copper
	Lead
	Magnesium
	Mercury
	Molybdenum
	Nickel
	Selenium
	Zinc

depth and extent of the source size of any potential contaminants which might be found.

Field soil samples collected from backhoe pits for physical and chemical analysis will be labeled, sealed, and placed on ice until analyzed. All samples will be maintained under chain-of-custody protocol through shipment to the analytical laboratory, within one week of collection, for analysis of the parameters listed in Table 2.1. Samples will be considered "unanalyzed samples of hazardous wastes from other than closed containers" for shipping purposes. All applicable DOT shipping regulations will be strictly adhered to.

2.4 Ground Water Monitor Well Installation (Phase II)

Ground water monitor wells will be installed only if the shallow soil investigation program indicates that a ground water contamination potential exists. The purpose of the wells will be to obtain additional information about the local stratigraphy and to obtain representative ground water samples to characterize chemical transport pathways and extent.

At least one well will be located upgradient of the property if it is determined that ground water flows predominantly in one direction throughout the property. The data from this well will be used to determine background ground water quality and serve as the basis for statistical analysis of changes that may have occurred in ground water quality downgradient from the property.

Deep borings for the installation of ground water monitoring wells will be conducted using hollow stem augers. Continuous split spoon samples will be collected in each boring to termination with all blow counts recorded. All borings will be logged by a qualified geologist and preserved for chemical or physical analysis in the appropriate sample containers. All field measurements and observations will be recorded in a field logbook by a registered geologist. The wells will be installed in the uppermost continuous water bearing layer beneath the property.

Intermittent soil samples for chemical or physical analysis will be obtained from the continuous soil sampling. Soil samples will be obtained using a split-barrel sampler with a catching mechanism. The soil samples will be logged in the field and placed in sample containers. It is expected that one or two soil samples from each of the well installation will be analyzed for a variety of physical and chemical parameters.

The monitoring wells will be completed according to the well detail provided in Figure 2-4. The wells will be completed by inserting 10 feet of .010 inch slotted Schedule 40 2-inch inner diameter well screen connected by threaded flush joints to Schedule 40 2-inch inner diameter casing extending at least 1 foot above the ground surface. The well screen will extend to at least two feet above the water table. An appropriately sized sand pack will be placed around the screen and extend a minimum of one foot above the top of the screen. The annular space above the sand pack will be sealed with either a bentonite slurry or bentonite pellets. A surface seal of neat cement will extend three feet below

the ground surface into which the protective steel casing will be inserted. Each well will be developed upon completion to remove any drilling fluids or fines from the screened area.

2.5 Well Sampling and Ground Water Monitoring

Ground water samples will be obtained from existing water production wells, or from any ground water monitoring wells installed during the study.

In order to remove potentially unrepresentative ground water samples, each well will also be flushed by pumping or bailing prior to sampling. Temperature and specific conductance will be monitored in each well during evacuation. When these parameters stabilize (less than 5% difference between successive readings), sampling will commence. If the wells do not produce adequate quantities of water, then a minimum of three well volumes will be evacuated prior to sampling. Water level measurements in each well will be recorded prior to sampling and evacuation. Ground water samples will be collected from each well using a bailer or peristaltic pump. Ground water monitoring and potable water supply wells will be analyzed in the field for temperature, pH and conductivity. Samples will subsequently analyzed for the parameters listed in Table 2-2.

2.5.1 Analytical Requirements

Samples from existing water production wells and from ground water monitor wells installed in this study will be analyzed

TABLE 2.2

GROUND/SURFACE WATER SAMPLE
PARAMETERS

<u>Field</u>	<u>Laboratory</u>
Temperature	Volatile Organic Compounds
pH	Polychlorinated Biphenyls
Specific Conductivity	Cyanide
	Arsenic
	Barium
	Cadmium
	Chromium
	Copper
	Lead
	Magnesium
	Mercury
	Molybdenum
	Nickel
	Selenium
	Zinc

for priority pollutant volatiles, PCB's, and heavy metals using EPA approved methods.

2.5.2 Analytical Quality Assurance

To monitor analytical laboratory performance, blank and duplicate samples will be submitted with samples collected in the field. All of the quality assurance samples will be prepared in the field and issued a sample number. The laboratory will not be notified in advance of the exact nature of the quality assurance samples.

Blank samples will be distilled water. One quality assurance sample will be submitted for approximately every ten soil or ground water samples.

2.6 Surface Water Monitoring

Surface water samples will be collected from locations indicated on Figure 2-5 as a means of assessing the surface water transport of contaminants from the property. Stream sediment samples will also be obtained from each point where surface water samples are obtained.

Surface water and sediment samples will be collected following EPA procedures. Field samples will be placed on ice until analyzed and will follow chain-of-custody protocol.

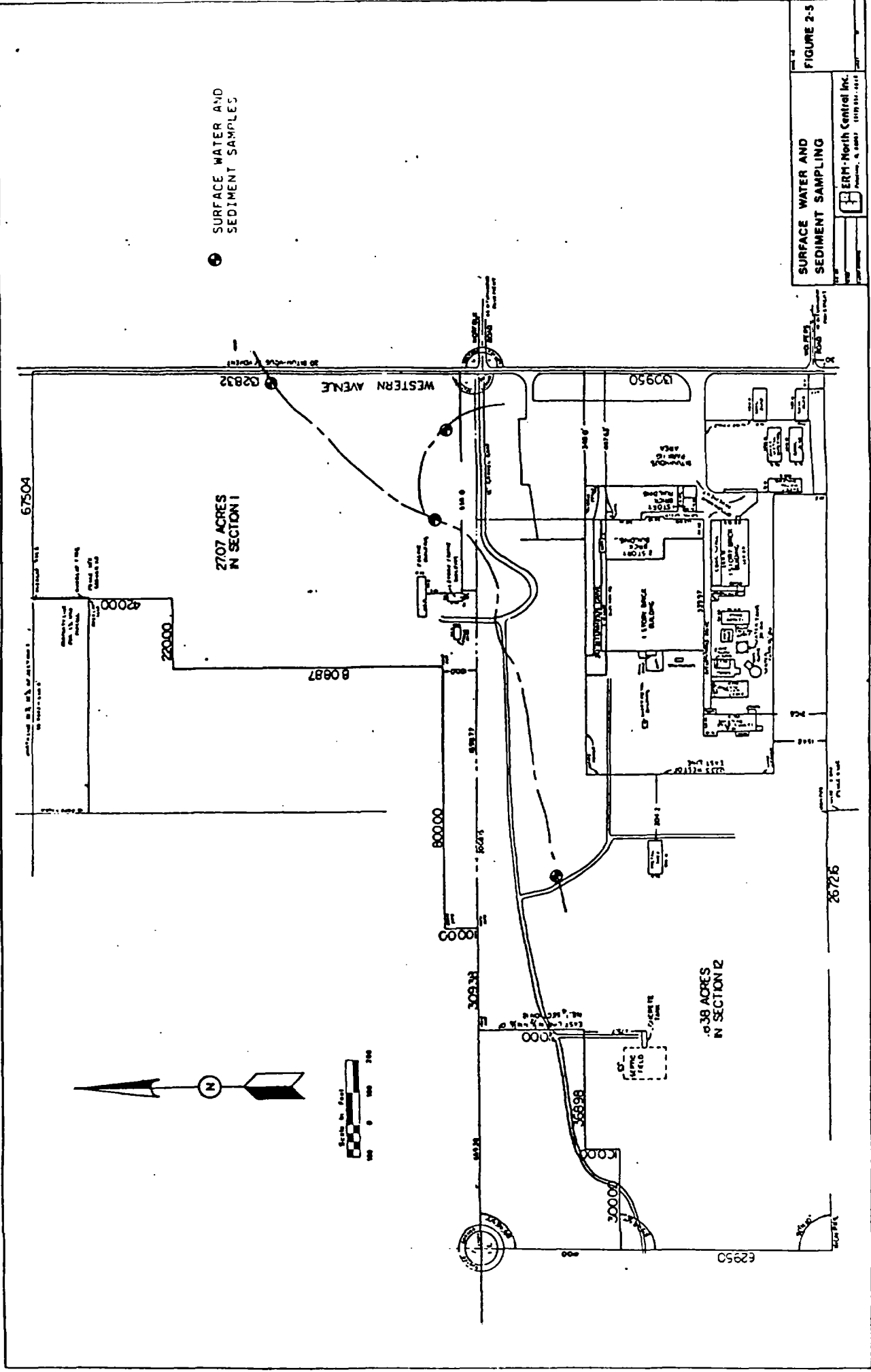


FIGURE 2-3

SURFACE WATER AND SEDIMENT SAMPLING

ERM-North Central Inc.

Project: 010001 10/10/01-01/01

2.7 Data Analysis/Interpretation

The data obtained during the remedial investigation will be compiled and evaluated following the field investigation and will be provided to the agencies on request.

The primary purpose of the data analysis and review task will be to characterize the property, evaluate the distribution of possible contaminants, and determine the ground and surface water transport pathways for migration.

2.8 Project Characterization

Information from the data surveys and field boring programs will be reduced, compiled, and reviewed. The inter-relationship of surface water to ground water and the recharge/discharge characteristics of the shallow and deep ground water flow systems will be assessed in the project characterization study. These data will be used to assess and evaluate the quantity and chemical characteristics of materials remaining or released on the property. This information, and data from the water quality monitoring program, will be used as the basis for the risk assessment studies.

2.9 Remedial Investigation Report

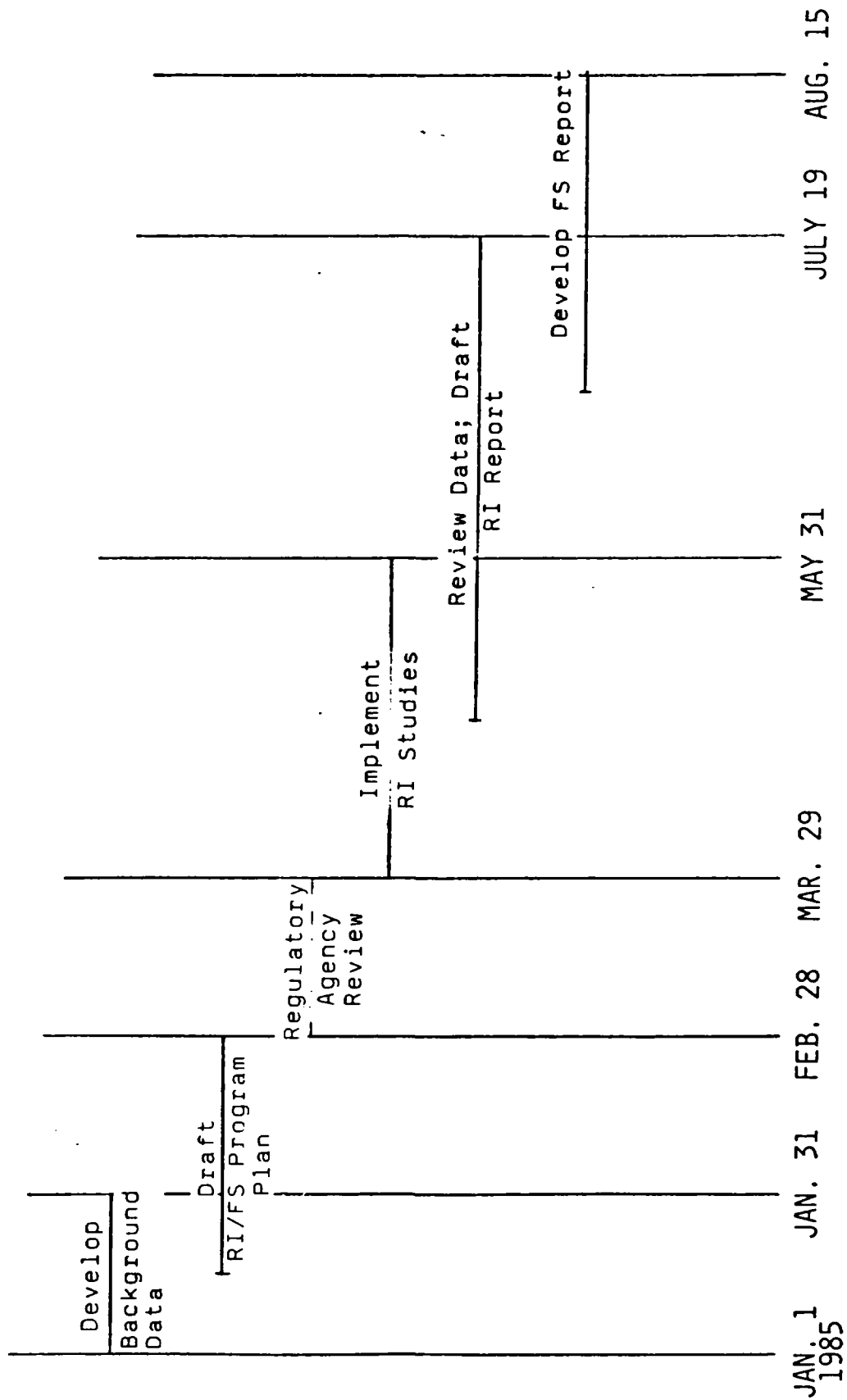
A Remedial Investigation Report will be prepared which will summarize the results of the environmental monitoring and the data interpretation and endangerment assessment tasks.

2.10 Remedial Investigation Schedule

Figure 2-6 shows the anticipated project schedule for the overall remedial investigation/feasibility study.

FIGURE 2-6

ANTICIPATED PROJECT SCHEDULE



SECTION 3

PROJECT SAMPLING PLAN

3.0 INTRODUCTION

This project Sampling Plan is part of a Remedial Investigation at the property owned by DESA Industries, Inc., and operated currently by Continental/Midland. The property is located at 25000 South Western Avenue, Park Forest, Illinois (Figure 3-1). The Remedial Investigation will identify and characterize the source and distribution of chemicals and chemical constituents at, or emanating from, the property, and gather sufficient data and information as a first step to determine the necessity for, and extent of, remedial action at the property. Such remedial action as may prove necessary will be done in accordance with Section 300.69 (f) of the National Contingency Plan, 47 Federal Register, Page 31217 (July 16, 1982).

3.1 Objectives

The primary objectives of the Park Forest property Remedial Investigation are:

- (1) To characterize and approximate the quantities of any materials found in the soil, ground water or surface water on the property.
- (2) To estimate the approximate quantities of potential contaminants.
- (3) To evaluate the types and quantities of chemicals migrating from the property.

- (5) To provide adequate data to support the endangerment evaluation and feasibility study.

The work tasks which comprise the Remedial Investigation are outlined in subsequent segments of the Project Sampling Plan.

3.2 Project Personnel

Key personnel for the Remedial Investigation are:

<u>Title</u>	<u>Name</u>	<u>Company</u>	<u>Address</u>
Project Manager	J. W. Polich	ERM	Palatine, IL
Quality Assurance Manager	R. O. Ball, Ph.D.	ERM	Palatine, IL
Project Engineer	F. J. Blaha	ERM	Palatine, IL
Project Hydrogeologist	P. Gruber	ERM	Palatine, IL
Drilling Subcontractor	B. Fox	Canonie Const.	Itasca, IL
Leak Testing	E. Schulster	Hunter Envr. Services	Schaumburg, IL
Analytical	J. Logsdon	Rocky Mountain Analytical	Arvada, CO

Mr. Gruber, as project hydrogeologist will directly supervise all field soil and subsurface investigations.

3.3 Field Activities

The field investigation will consist of a data survey, boring program, soil analyses, surface water sampling program, potable water sampling, and, if required well installation, and ground water sampling program. Any borings for monitoring well installation will be installed by experienced crews. The estimated schedule for the Remedial Investigation is presented in the Remedial Investigation Work Plan. It is expected that the data survey will be completed prior to the other field activities. The boring, well installation, and sampling program will then be conducted. The individual work tasks of the Remedial Investigation are discussed in subsequent sections of this Project Sampling Plan.

3.3.1 Data Surveys

Data surveys can provide a relatively rapid means for mapping subsurface conditions. Base data will be obtained from the Illinois water and geological surveys, the United States Geological survey, the Soil Conservation Service, local well drilling contractors, and aerial photographs.

3.3.2 Boring Program

The purpose of the sampling program is to evaluate the lateral and vertical extent and distribution of chemicals on the property. During the initial stages of the investigations, the majority of samples will be soil samples obtained from soil borings or backhoe pits. Each bore hole will be logged by a registered geologist to provide a physical description and visual characterization of the materials encountered.

Shallow soil borings and backhoe pits will be completed and soil samples analyzed before any deep boreholes are installed. Deep boreholes and monitoring wells will be installed only if analytical results from the shallow soil sampling program show that further studies are necessary. The location and number of any such deep boreholes and/or monitoring wells will be based on the analytical results.

Depth to water or free liquid levels will be measured whenever present in a boring or pit. At least one sample of the water or free liquids will be obtained for laboratory analysis.

3.3.2.1 Shallow Soil Sampling

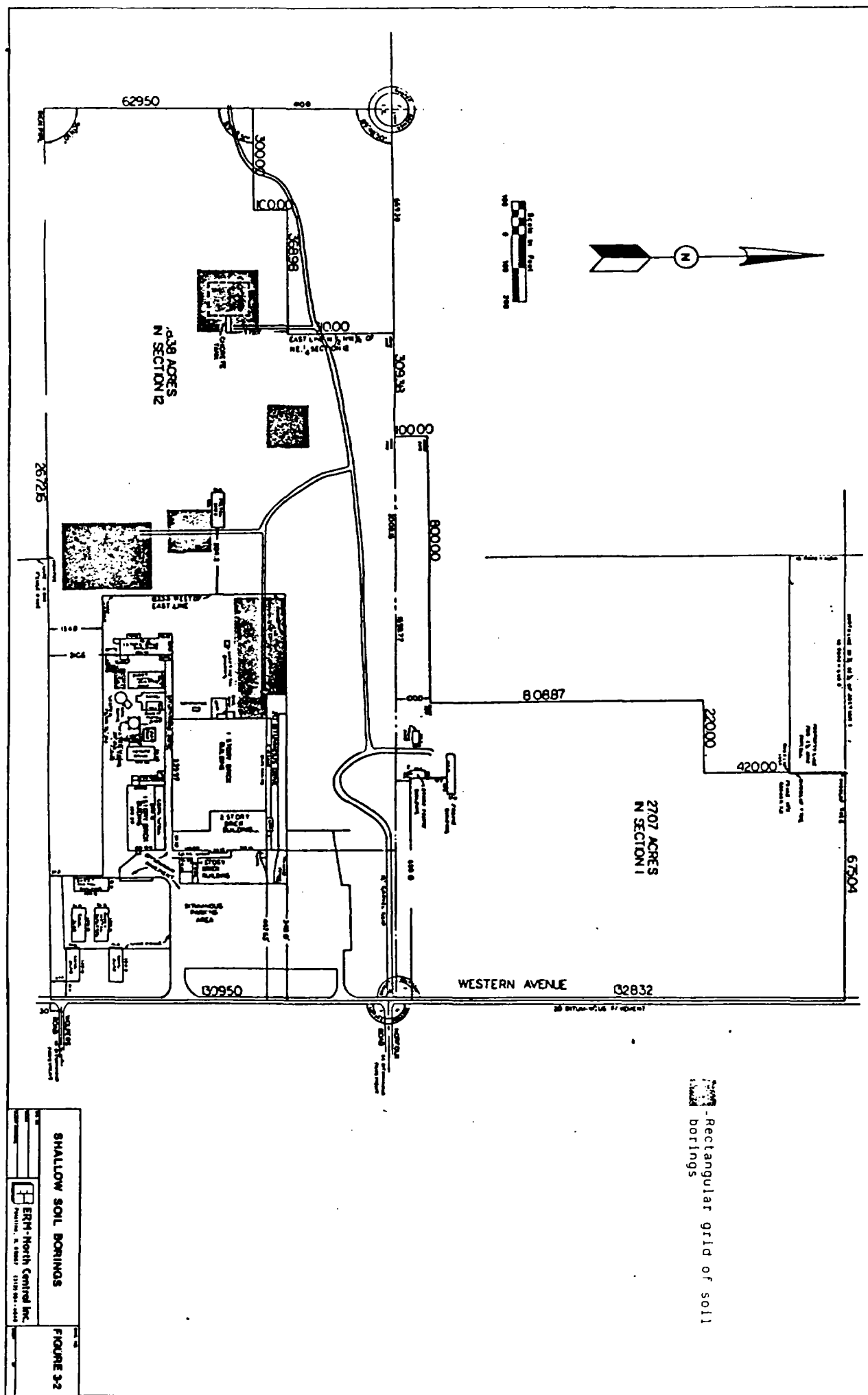
Unsaturated zone soil samples, including surface soil, will be collected from the areas indicated on Figure 3.2. A rectangular grid will be used to locate each particular shallow soil boring in the indicated areas. The distance

between nodes on the grid will be determined by the accuracy desired for that area. Soil samples from four to six borings will be composited for analytical work, again dependent on the desired accuracy of results. Composite soil samples will be logged, placed in glass containers, labeled, and placed on ice for shipment to the analytical laboratory. These samples will be shipped under chain-of-custody procedures labelled as "Unanalyzed Samples of Hazardous Waste from Other Than Closed Containers" for shipping purposes.

In order to find all potential hot spots in an area within a given level of confidence, a specific grid spacing will be required. Likewise, the probability of finding a hot spot of a certain size can be determined given a particular grid spacing. The sampling grid developed will be based upon an understanding of the property history and the potential for contamination. The sampling grid currently being considered is a systematic grid and covers only those areas likely to have contamination. A description of the gridding methodology is included in Appendix D. A sufficient number of random samples will be collected from other areas around the plant to ensure that, within a certain level of confidence, the remainder of the property is free from contamination.

3.3.2.2 Deep Soil Sampling

The boreholes from which deep soil samples will be obtained will be located based on the results of the shallow soil sampling and backhoe test pit program and geophysical studies. These boreholes will serve both as soil sampling



SHALLOW SOIL BORINGS

ERM - North Central Inc.

FIGURE 3-2

and ground water monitoring well locations up and downgradient from any contaminated areas.

The soil profile in all deep borings will be logged continuously by a qualified geologist. Split spoon samples will be collected continuously in at least one boring. In each successive boring, samples will be collected at five foot intervals.

Selected soil samples obtained from the split spoon sampling of each deep boring will be sent to the laboratory for analysis. Monitoring wells will be constructed in each boring and screened at the first continuous water bearing unit beneath the property. A minimum of 10 feet of well screen will be inserted in each boring and extend at least two feet above the local water table. The well construction will be as shown in Figure 3-3.

3.3.2.3 Ground Water Sampling

At least three sets of ground water quality samples will be collected from any wells installed. Each well will be developed to remove fine grained materials and drilling fluids introduced into the formation during drilling. Well development will be performed using either a PVC bailer or a submersible pump. A minimum of three well volumes of water will be removed from each well. Temperature, pH, and specific conductance will be monitored during development. Development will be terminated upon stabilization of these measurements.

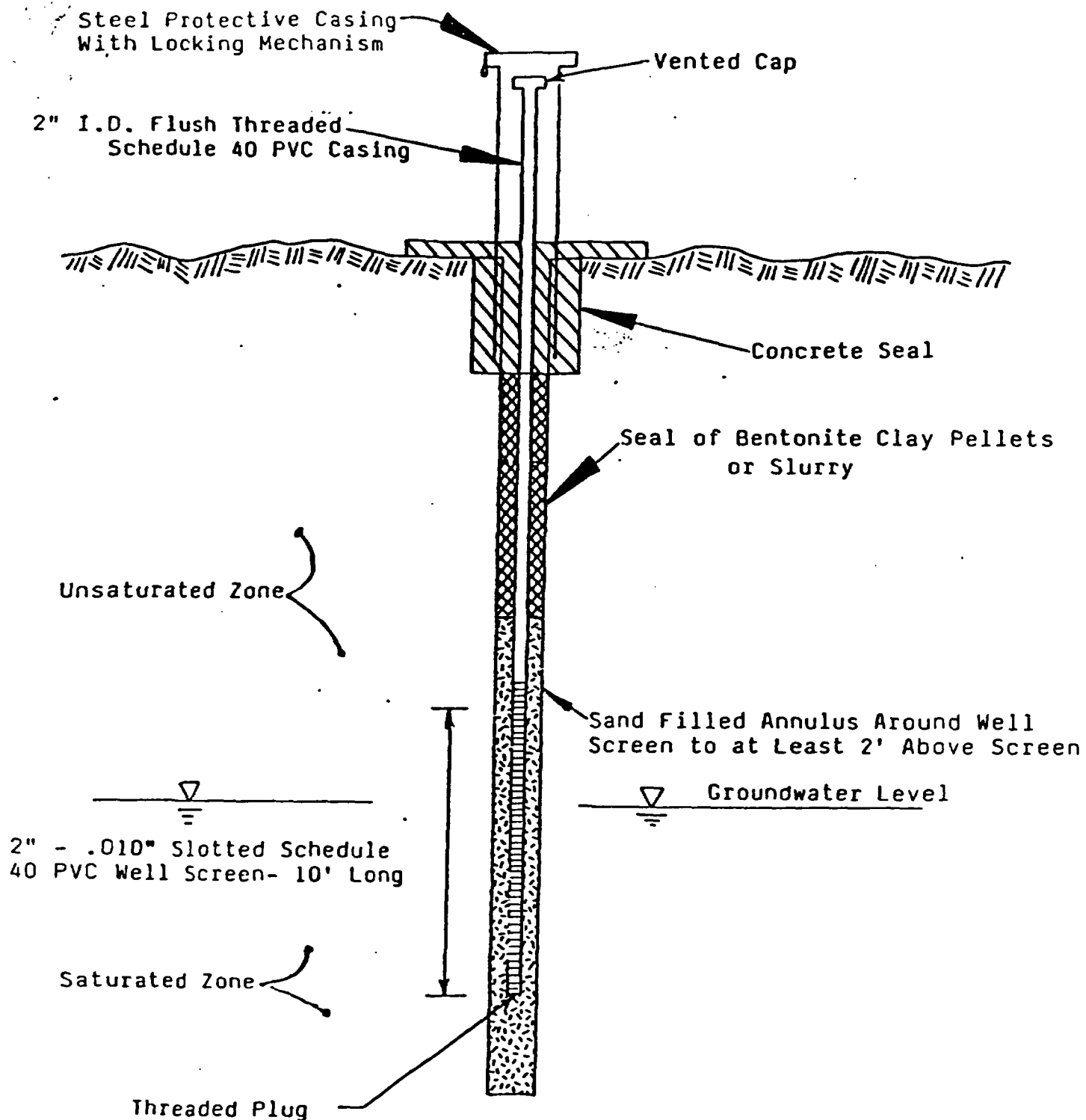
In order to remove potentially stagnant ground water, stratified fluids, or residual chemicals, any well to be sampled will be flushed prior to sampling until pH, temperature, and specific conductance have stabilized. Well flushing will be accomplished by removing a minimum of three well volumes of water. Ground water samples will be obtained from each well within twenty-four hours of this flushing. The water samples will then be placed in their respective containers.

The volatile fraction sample from each boring will be placed in two 40-ml vials with Teflon® Septums. Each vial will be filled to the septum, sealed and then inverted to check for air bubbles. Should air bubbles appear, the process will be repeated until an air-free sample is obtained.


Where split samples are obtained, the first bail of water will be used to rinse the sample containers. Subsequent bails will be used to place equal portions of water in the containers for each sample. The process will be repeated until the containers are full.

3.3.2.4 Surface Water Sampling

Surface water samples will be collected using a grab type sampler. All surface water samples will be monitored for pH, temperature, and specific conductance to determine the recharge/discharge relationship to ground water. Before collecting each sample, the sampling device will be thoroughly cleaned and decontaminated. The sampler will be rinsed with tap water and then rinsed with the water to be sampled.



NOTE: Not to scale.

TYPICAL WELL INSTALLATION		DWG. NO.
		FIGURE 3-3
NO. 10	 ERM-North Central Inc. Palatine, IL 60067 (312) 934-4646	SHEET OF
SCALE		
CLIENT APPROVAL		

Immediately after collection, the samples will be placed in the appropriately sized containers, preserved, and inserted into sample shuttles and put on ice. The analytical parameters dictate the type and size of subsample containers, and the preservative. The type of sample containers and preservatives used will conform to those listed in Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

Special care will be taken with the subsamples to be analyzed for volatile organic compounds. The protocol for volatile fraction sampling will be the same as that described for ground water sampling.

Surface water samples will be analyzed for the constituents listed in Table 3-1 at the locations indicated in Figure 3-4.

3.3.2.5 Sample Handling and Shipment

The soil and water samples will be logged and labelled in the field. All observations and labels will be recorded in a field notebook.

Soil compositing will be accomplished by placing portions of the samples to be analyzed in large disposable aluminum pans for mixing prior to sampling. The composite sample will then be placed in a glass sample container. This container will be tightly filled and labelled, sealed in a plastic bag and placed in a cooler cushioned with absorbent material. All samples will be maintained under chain-of-custody

TABLE 3-1
GROUND/SURFACE WATER SAMPLE
PARAMETERS

<u>Field</u>	<u>Laboratory</u>
Temperature	Volatile Organic Compounds
pH	Polychlorinated biphenyls
Specific Conductivity	Cyanide
	Arsenic
	Barium
	Cadmium
	Chromium
	Copper
	Lead
	Magnesium
	Mercury
	Molybdenum
	Nickel
	Selenium
	Zinc

protocol through shipment to the analytical laboratory (within one week of collection). Each sample container will be marked with a label similar to the one shown in Figure 3-5 which provides the sample number, location, date, time, and the analyses to be performed on the sample. A chain-of-custody form will accompany each cooler or carton of samples shipped to the lab and each group of sample splits transferred to the requesting agency. An example chain-of-custody form is shown on Figure 3-6.

The sample container will be shipped via express mail service to the analytical laboratory. The samples will be considered "Unanalyzed Samples of Hazardous Wastes from Other than Closed Containers" for purposes of shipment and applicable regulations will be followed.

All samples obtained during the investigation will be retained for possible future analyses.

3.3.3 Decontamination

Equipment decontamination will be required to control the possible movement of contaminants to clean areas, prevent the cross contamination of bore holes and samples, and assist in maintaining the health and safety of personnel. Decontamination of the drilling and sampling equipment, PVC pipe, screen, and well casing will be required.

The decontamination effort will be subdivided into two phases. The first phase, accomplished prior to drilling, will consist of a thorough cleaning of the rear portion of the drill rig, drill rods and bits, threads, sampling

FIGURE 3-5. SAMPLE LABEL

SAMPLE NO. _____
 PROJECT NO. _____
 PERSONNEL _____

 DATE _____ TIME _____
 COMPOSITE _____ GRAB _____

 TYPE: SOIL _____ WATER _____ SLUDGE _____
 OTHER (EXPLAIN) _____

ANALYSIS

PP Volatiles	_____	SO ₄	_____
PP B/N	_____	Cl ₄	_____
PP Acids	_____	Total CN	_____
PP Pesticides	_____	NO ₃	_____
Metals	_____	pH ₃	_____
COD	_____	Spec Cond	_____
TDS	_____	Hex Cr	_____
TOH	_____	Free Lime	_____
TOC	_____	Other	_____
CO ₃ HCO ₃	_____	Preservatives	_____

FIGURE 3-6

CHAIN OF CUSTODY RECORD

Project Name _____ Collector's Sample No. _____

Project Number _____

Site: _____

Location of Sampling: _____

Type of Sample _____

Company's Name _____ Telephone () _____

Address _____
 number street city state zip

Volume Collected _____ Number of Containers _____

Collector's Name _____ Telephone () _____

Signature _____

Date Sampled _____ Time Sampled _____ (am/pm)

Field Information _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Authorization For Disposal _____ Date/Time: _____

Disposed By: _____ Date/Time: _____

equipment, PVC pipe, screen, and the well casing. This cleaning will consist of a preliminary rinse using high-pressure potable water to remove encrusted soil. The equipment and materials will then be steam washed with detergent and potable water and then steam rinsed with potable water.

The second phase of the decontamination process will be the cleaning of drilling equipment between holes. The drill rods and bits and reusable sampling equipment will be rinsed with high-pressure water to remove mud and then steam rinsed. Care shall be exercised by all personnel involved to prevent cross contamination of the bore holes.

The sample bailers, which are dedicated to each well, will be cleaned with acetone, then cleaned with Alconox and water, and finally rinsed with distilled water and packaged in a plastic container. The sample bailers will be placed in decontaminated sections of PVC pipe with end caps while the wells are being flushed prior to sampling. Ground water samplers will be required to wash their gloves in Alconox and water and rinse them in distilled water prior to obtaining each sample.

3.4 Analytical Requirements for Soil and Water Samples

The soil samples will be submitted to an analytical laboratory for the analyses listed in Table 3-2.

TABLE 3-2

SOIL SAMPLE
PHYSICAL/CHEMICAL PARAMETERS

<u>Physical</u>	<u>Chemical</u>
Unified Soil Classification	Volatile Organic Compounds
Permeability	Polychlorinated biphenyls
	Cyanide
	Arsenic
	Barium
	Cadmium
	Chromium
	Copper
	Lead
	Magnesium
	Mercury
	Molybdenum
	Nickel
	Selenium
	Zinc

The laboratory QA/QC Program is based upon the quality assurance guidelines provided in the following government publications:

"Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA-600/4-79-019. March 1979;

National Enforcement Investigation Center Policies, and Procedures Manual, EPA-330/9/79/001-R. October 1979;

The recommended guidelines for EPA Methods 624 and 625. (Federal Register, December 3, 1979, pp. 69532-69559);

"Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980; and

"Determination of 2,3,7,8-TCDD in Soil and Sediment," EPA, Region VII, Kansas City, September 1983.

To monitor analytical laboratory performance, blank, spike, or duplicate samples will be submitted with the samples collected in the field. The purpose of the field QC samples is to provide additional data to monitor the accuracy and repeatability of the laboratory analyses. It is believed that the combined laboratory and field QC procedures will provide an adequate data base for evaluation of analytical data. The spike samples will consist of typical sample materials spiked with organic or metal constituents. One duplicate or spike sample will be submitted to the analytical laboratory for every ten samples.

3.5 Safety

All field activities will be conducted in accordance with the Project Safety Plan.

3.6 Documentation and Reporting

Field activities will be recorded daily in the field activities logbook. Sample numbers and airbill numbers, sampling date and times and the physical characteristics of the samples will be recorded in the sample logbook.

SECTION 4

PROJECT SAFETY PLAN

4.0 INTRODUCTION

This Section presents the safety procedures to be followed during the Remedial Investigation, and all subsequent work performed on, or adjacent to, the Property, to protect the health and safety of field personnel.

4.1 General Information

The following information is provided to acquaint personnel with the names and responsibilities of designated safety personnel, emergency agency telephone numbers, the nature of potential health and safety hazards, as well as general rules pertaining to activities in the field.

4.1.1 Project Safety Officer

The Project Safety Officer (PSO) is responsible for daily supervision of all safety, decontamination and environmental monitoring activities associated with the remedial investigation. The PSO is also charged with assuring that all remedial investigation personnel comply with the provisions of this plan in the field. The PSO has the authority to stop work in the event of an emergency (or safety plan violation), to start work following any

stoppage, and to approve modifications to safety plan requirements based upon field conditions.

4.1.2 Emergency Agencies

A list of emergency telephone numbers is provided below and will be posted at the Site:

Ambulance - Park Forest Ambulance Service,
(312) 756-5151

Fire - Park Forest Fire Department,
(312) 756-5151

Police - Park Forest Police Department,
(312) 756-5151

Hospital - St. James Hospital, Chicago Heights,
(312) 756-1000

4.1.3 Key Personnel

<u>Title</u>	<u>Name</u>	<u>Company</u>	<u>Telephone</u>
Project Manager	J.W. Polich	ERM	(312) 934-4646
Project Safety Officer	P. Gruber	ERM	(312) 934-4646
Back-Up Project Safety Officer	F. J. Blaha	ERM	(312) 934-4646

4.1.4 Nature of Potential Hazards

4.1.4.a Chemical

The manufacturing operations associated with the property involved large volumes of metals with associated oils and degreasing operations. Previous operations at the plant also involved metal processing including surface preparation (degreasing, cleaning) and final finishing (plating, painting).

Based upon available information, the following potential hazards have been identified as being of concern for personnel:

- o Buried saw blades and other discarded metal objects
- o Buried reactive materials (magnesium chips)
- o Caustic contamination of soil and ground water
- o Contamination of soil with heavy metals (paints and paint sludges)
- o Potential exposure to PCB's (previous analytical results)
- o Puncture of buried drums
- o Exposure to cutting oils and other oils or vapors
- o Puncture of underground piping
- o Buried electrical utility lines

Available information indicates that the hazards presented by the property to remedial investigation personnel are minimal. The major hazard to personnel is considered to be exposure to soil and water potentially contaminated with

hazardous constituents, of which heavy metals are of the most concern. Since volatile organics have not been disposed on the property since at least 1968 when DESA began operation, and since no past operations involving the burial of filled and sealed drums is known of, it is expected that volatile organic compounds will have largely volatilized. Furthermore, any reactive materials are believed to have been largely spent.

4.1.4.b Physical

There is a risk associated with injury resulting from contact with the equipment and facilities as well as the equipment used during the investigation. Personnel are cognizant of the fact that any protective apparel worn may limit visibility, hearing and manual dexterity. In addition, if protective equipment is required, (e.g., Tyvek coveralls and respirators) this may place a physical strain on the wearer.

4.1.5 Sample Handling and Analyses

The procedures to be followed for handling and shipping samples, and a description of the project analytical requirements are contained in the Project Sampling Plan and the Remedial Investigation Work Plan.

4.2 General Work Procedures

Industrial operations at the plant are still on-going and all remedial investigation work will be performed during normal working hours. Remedial investigation work will not take place within industrial buildings still in

use. Remedial investigation work will take place outside all industrial buildings. Normal plant safety procedures will be observed during all remedial investigation work.

Entry and exit procedures will be those procedures normally used except that the PSO will require workers and other personnel near on-going remedial investigation activities to wear required protective clothing and to observe all necessary safety precautions. All industrial buildings are surrounded by a security fence which does not, however, enclose all the surrounding property owned by DESA. Entry to the industrial manufacturing area is restricted by security guards who require adequate identification and clearance.

In the event of an accident, exposure to contamination or other emergency, the PSO will stop work and determine the actions to be taken. Remedial investigation personnel working should immediately leave the area (but remain in their protective gear). Injured personnel may be removed from any immediate hazard.

If an evacuation is ordered by the PSO, personnel may be instructed to leave by routes other than those normally used.

No eating, drinking or smoking will be allowed near any remedial investigation area. Investigation personnel will go through decontamination procedures for lunch breaks and will be allowed to eat lunch within existing buildings.

4.3 Safety Training

All personnel will be required to attend a training program. The content of this program will include discussions of potential hazards, any required protective equipment, any decontamination procedures (including practice), and the use of monitoring equipment. Field personnel will be required to sign a certificate at the conclusion of the training program.

4.4 Environmental Monitoring Program

During the course of the investigation, ambient air quality will be monitored in the vicinity of any subsurface operations. The following instrumentation and procedures will be used.

4.4.1 Organic Vapor Analyzer (OVA)

An OVA will be used in the survey made to monitor air quality for toxic organic vapors. The instrument to be used is American Gas and Chemical Company, Limited Model 501. At each backhoe location and/or well location, the ambient background reading will first be determined upwind. The OVA audible alarm will be set to sound when readings exceed 4 parts per million (ppm) above the background reading.

In the event of elevated readings, personnel will move away from the immediate area while the PSO takes further readings. The PSO will assess the situation and determine actions to be taken.

4.4.2 Combustible Gas Monitor

A combustible gas monitor will be used during drilling operations in areas where solvent disposal is suspected. The instrument to be used is Gastech Incorporated Model GP-204. The instrument can be positioned to continually monitor the ambient atmosphere; if bore holes are to be installed, they will be monitored periodically. A reading of 25 percent of the Lower Explosive Limit (LEL) will be considered the maximum allowable for continuation of work. If the reading exceeds 25 percent LEL, drilling will stop, personnel will move away from the immediate area and the PSO will be notified. After assessing the situation, the PSO will take appropriate actions. All readings (background and monitoring) will be recorded by the PSO in a logbook. The time, date, weather conditions, boring number and other pertinent observations will be recorded with the readings.

4.5 Communications

The plant is equipped with telephone service for both local and long distance calls. This telephone system will be used to request help or back-up equipment in the case of an emergency situation. The security guards have access to both this telephone system and to the plant official with the authority to request outside help. Therefore, the investigation team will be supplied with two-way radios so that the security guards may be contacted at any time from any location.

4.6 Required Protective Equipment

The type of protective gear required is dependent upon the nature and location of the work performed and the past history and use of that location. Based on the property history and preliminary reviews the following level of protection is to be worn for all investigative work.

The equipment includes:

- o White tyvek coverall
- o Neoprene or PVC work boots
- o Neoprene or nitrile work gloves
- o Hard hat
- o Safety glasses

The PSO has the authority to modify required levels of protection in response to field conditions. The PSO may restrict access as he deems necessary regardless of the protective gear worn.

4.7 Decontamination Procedures

4.7.1 General Information

Decontamination of equipment and personnel will be performed to extend the useful life of the safety equipment, and to limit the migration of any contaminants both off the property and between work areas.

All drilling equipment and other tools, and all well materials, will be cleaned prior to entry to remove grease, oil, encrusted dirt or other materials. Special attention will be given to the rear portions of drill rigs, auger

flights and drill rods (inside and outside), and sampling tools. An inspection of all rigs will be made by the project manager and PSO prior to approving equipment for use.

Water obtained from water production wells on the property will be chemically analyzed before the field work begins. If these water samples are shown to be uncontaminated with hazardous constituents, then the production well water can be used for decontamination of equipment and personnel.

4.7.2 Equipment Decontamination

All reusable sampling equipment, auger flights, and any other tools used for intrusive work will be decontaminated between borings. Cleaning will consist of scrubbing to remove encrusted materials followed by a soap-and-water wash and potable water rinse using a high-pressure hot water or steam cleaning unit. Additional rinses with other compounds, such as organic solvents, may be used if warranted by the nature of the waste materials.

Following decontamination, the clean equipment will be stored on plastic sheeting and/or sawhorses if not immediately reused. This equipment will also be covered with plastic.

At the conclusion of work, all drilling rigs will be thoroughly cleaned using the method previously described.

4.7.3 Personnel Decontamination

Decontamination of personnel will be performed at existing plant facilities. Personnel decontamination will consist primarily of soap-and-water hand washings to remove contaminants, followed by doffing of the gear. Coveralls and gloves should be removed by turning the items inside out. The general sequence of doffing procedures is outlined below. The extent of washing required, or modifications to the sequence, may be specified by the PSO.

Steps in decontamination will be:

1. Wash work gloves and boots;
2. Rinse work gloves and boots;
3. Remove boots and gloves;
4. Remove Tyvek coverall.

4.7.4 Containerization of Decontamination By-Products

Gloves and coveralls will be changed daily and will be disposed of in a separate plastic bag, sealed, and disposed of with the general plant refuse.

4.7.5 Containerization of Drilling By-Products

Auger cuttings and any drilling fluids generated will be drummed and stored on the property until the analytical results are obtained. If the analytical results indicate the material is classified as a hazardous waste, they will be disposed of at an approved facility.

4.8 Personnel Safety Certification

All personnel are required to sign and date the attached certification prior to working on the property (Attachment 4.1). The document will be retained in the project files.

ATTACHMENT 4.1

PERSONNEL SAFETY CERTIFICATION

Safety Plan Certification

All project personnel are required to make the following certification prior to conducting work at the AMCA Park Forest Property.

I _____ certify that:

1. I have read and understand the Project Safety Plan, and that
2. I will abide by the provisions of the Project Safety Plan.
3. I have attended the Project Safety Training program provided by ERM-North Central.

Signature _____

Date _____

SECTION 5
QUALITY ASSURANCE PLAN

5.0 PROJECT DESCRIPTION

The primary objectives of the Remedial Investigation at the Park Forest property are:

1. To determine if soil, subsoils and ground water are contaminated.
2. If so, to characterize the type of contamination and estimate the approximate quantities of materials.
3. To assess the impact of any such contamination on potential receptors.
4. To provide adequate data to support an endangerment evaluation and feasibility study.

The Remedial Investigation will be performed by:

Environmental Resources Management-North Central, Inc.
835 Sterling Avenue
Palatine, IL 60067
(312) 934-4646

5.1 Project Sampling Program

Table 5-1 is a listing of laboratory analysis for the various samples to be obtained.

5.2 Analytical Procedures

Laboratory analysis of soil, potable water, surface water, and ground water will be performed by Rocky Mountain Analytical Laboratory (RMA), Arvada, Colorado. The laboratory has an extensive QA program. The existing quality assurance protocol of RMA is based upon the following government guidelines:

"Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA-600/4-79-019, March 1979;

National Enforcement Investigation Center Policies, and Procedures Manual, EPA-330/9/79/001-R, October 1979;

The recommended guidelines for EPA Methods 624 and 625. (Federal Register, December 3, 1979, pp. 69532-69559);

"Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980; and

"Determination of 2,3,7,8-TCDD in Soil and Sediment," EPA, Region VII, Kansas City, September 1983.

Appendix B includes RMA laboratory methodologies and a description of their quality assurance program.

TABLE 5-1
SAMPLING PROGRAM

<u>Parameter</u>	<u>Soil</u>	<u>Water Production Wells</u>	<u>Surface Water</u>	<u>Stream Sediment</u>	<u>Ground Water</u>
Unirradiated Soil					
Classification	x				
Permeability	x				
Temperature		x	x		x
pH		x	x		x
Specific Conductivity		x	x		x
Volatile Organic Compounds	x	x	x	x	x
Polychlorinated Biphenyls	x	x	x	x	x
Cyanide	x	x	x	x	x
Arsenic	x	x	x	x	x
Barium	x	x	x	x	x
Cadmium	x	x	x	x	x
Chromium	x	x	x	x	x
Copper	x	x	x	x	x
Lead	x	x	x	x	x
Magnesium	x	x	x	x	x
Mercury	x	x	x	x	x
Molybdenum	x	x	x	x	x
Nickel	x	x	x	x	x
Selenium	x	x	x	x	x
Zinc	x	x	x	x	x

Samples will be preserved in accordance with those procedures established in Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983. Volatile organic samples will be preserved with sodium thiosulfate, and cyanide samples will be preserved with sodium hydroxide. In addition, all aqueous samples will be preserved at 4°C and delivered to RMA the morning after they are collected. Soil samples will be stored at 4°C and will be shipped to the laboratory within one week of collection.

Laboratory quality control procedures for solid and liquid matrices are presented in Appendix E.

To monitor analytical laboratory performance, blank, spike, and replicate samples will be submitted with the samples collected in the field. The purpose of the field quality control samples is to provide additional data to monitor the accuracy and repeatability of the laboratory analyses. It is believed that the combined laboratory and field quality assurance procedures will provide an adequate base for the evaluation of analytical data.

For soil samples, the spike samples will consist of the sample materials spiked with organic or metal constituents. One replicate or spike sample will be submitted to the analytical laboratory for every ten soil samples.

For surface water and ground water samples, the blank samples will consist of distilled water. The spike samples may be prepared from distilled water or replicate samples spiked with organic constituents. One quality control

sample will be submitted to the analytical for every ten potable, surface or ground water samples.

5.3 Project Organization and Responsibility

5.3.1 Sampling Quality Control

Frank Blaha, ERM. Responsibilities will include maintenance of chain-of-custody on all samples collected, verification with sampling team personnel of sampling techniques and quality control procedures prior to field activities. Responsible for prompt review of any quality control deviation utilized in the field.

5.3.2 Laboratory Quality Control

John Logsdon, RMA. Responsibilities will include supervision of sample analyses of soil, potable, surface and ground water. Responsible for quality control procedures and quality control checks at RMA.

5.3.3 Data Analysis and Quality Control

Roy O. Ball, Ph.D., P.E., ERM. Responsible for all data review, validation and interpretation involved in this project.

5.3.4 Overall Quality Assurance

Roy O. Ball, Ph.D., P.E., ERM. Responsible for implementing the Quality Assurance Plan for this project.

5.4 Data Quality Requirements and Assessments

5.4.1 Data Representativeness

When sampled, monitoring wells will have three to five well volumes removed prior to collecting a sample to ensure that a representative sample has been obtained from the aquifer. Subsurface soil samples will be obtained from vertical depths in the soil column which are most likely to be contaminated or contain pore fluids other than water. As such, these samples will be representative of subsurface conditions. Each surface soil sample will be composited from four or five nodes of a system to ensure a representative sample. Surface water samples will be obtained using a grab-type sampler. The sample will be representative of surface water conditions.

5.4.2 Data Comparability

All aqueous sample data will be reported in ug/l(ppb). All soil samples will be reported in terms of mg/kg(ppm). Sampling protocol will be strictly adhered to.

5.4.3 Data Completeness

Less than 100 percent of the samples may be collected due to well accessibility problems and poor recovery of soils in split spoon samplers. The valid data required from the laboratory will be 90 percent of the samples submitted.

5.5 Sampling Procedures

Sampling procedures are provided in the Project Sampling Plan and the Remedial Investigation Work Plan.

5.6 Sample Custody Procedures

Sampling team personnel will perform all sampling and will retain custody until shipment to the laboratory. For all samples, a chain-of-custody form (Figure 5.1) will be used for each shuttle and for each group of sample splits transferred to others.

The field activities will be recorded daily in the field activities logbook. An outline of the requirements for field logbook entries is given in the Project Sampling Plan. The following information will be recorded in the sample logbook:

1. Exact sample location.
2. Name of sampler and witness.
3. Date and time of sample collection.
4. Sample number and airbill number.
5. All sampling conditions, i.e., type of material, weather, type of sampling container and preparation, description of sampling procedure, preservation, and shipping.
6. Field measurements of pH, temperature, salinity, specific conductance, and volume and

FIGURE 5.1

CHAIN OF CUSTODY RECORD

Project Name _____ Collector's Sample No. _____

Project Number _____

Site: _____

Location of Sampling: _____

Type of Sample _____

Company's Name _____ Telephone () _____

Address _____
 number street city state zip

Volume Collected _____ Number of Containers _____

Collector's Name _____ Telephone () _____

Signature _____

Date Sampled _____ Time Sampled _____ (am/pm)

Field Information _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Authorization For Disposal _____ Date/Time: _____

Disposed By: _____ Date/Time: _____

characteristics of water removed during the development and flushing of wells.

RMA will provide all sample containers necessary for field sampling and QC requirements. Each lot of sample containers will be checked for cleanliness by the laboratory and closed to prevent contamination. Following sampling, each container will be labeled to indicate sample number, location, time and date, the analyses to be performed on the sample and packaged to prevent breakage. Field blanks, spike samples, custody seals, etc. will be added as required by the analytical procedures.

During the field studies, samples are received at the laboratory by the sample custodian who examines each sample to ensure that it is the expected sample, inspects the sample containers for possible damage, and ensures that the documentation is complete and adequate. The sample custodian will ensure that each sample has been preserved in the manner required by the particular test to be conducted and stored according to the correct procedure. Preservation and storage will require maintenance of 4°C until analysis begins.

5.7 Calibration Procedures and Preventive Maintenance

A maintenance, calibration, and operation program will be implemented to ensure routine calibration and maintenance will be performed on all field instruments. The program will be administered by the Project Safety Officer (PSO). The PSO will perform any scheduled monthly and annual

calibration and maintenance and will perform field calibrations, checks and instrument maintenance prior to use.

Team members will be familiar with the field calibration, operation, and maintenance of the equipment, maintain such proficiency, and will perform the prescribed field operating procedures outlined in the Operation and Field Manuals, accompanying the respective instruments, and keep a record of all field instrument calibrations and field checks in the field logbook. If monitoring equipment should fail, the Project Safety Officer will be contacted immediately. He will either provide replacement equipment or have the malfunction repaired immediately.

5.8 Documentation, Data Validation, and Reporting

5.8.1 Documentation

Lab sheets, sample labels, and/or field notebooks will carry the following information pertaining to sample I.D.:

1. Sample Identification Number
2. Project Identification Code
3. Sample Location Code
4. Date and time of sample collection
5. Initials of person collecting the sample
6. Analyses to be performed

All field data will be entered into notebooks. Field notebooks, Chain-of-Custody forms, field data sheets, and

lab reports will be filed and stored at ERM offices, 835 Sterling Avenue, Palatine, IL.

5.8.2 Data Validation

The precision of the laboratory data will be checked by comparison of the analytical results with the QC samples. The validity of the ground water and surface water data will also be assessed by comparison of blanks, spikes, replicates, and upgradient samples with downgradient and on-site samples. If priority pollutants are detected in the blanks, the priority pollutant data will be invalidated.

The laboratory will critique its own analytical program by the use of spiked addition recoveries, established detection limits for each matrix, precision and accuracy control charts, and by keeping accurate records of the calibration of instruments. RMA establishes average recoveries for surrogates over time, standard deviations, control and warning limits. When a sample recovery is outside the control limit, the sample analysis is repeated. If upon repetition the sample recovery is outside the control limits, the sample will be deemed unsuitable for the method and no further analysis will be conducted on the sample.

5.8.3 Reporting

Data will be reported in the Remedial Investigation Report prepared by ERM.

5.9 Performance and Corrective Actions

Corrective actions for laboratory analyses will be handled by consultation between the Laboratory Quality Assurance Officer and the Project Manager. The Project Manager will make immediate decision with the Laboratory Quality Assurance Officer on new protocols to be followed. All changes in laboratory procedures will be documented and reported in the final report.

Corrective action on a day-to-day basis for field sampling will be handled by consultation between the team members and the Project Manager. The Project Manager will make immediate decisions with the team members on new protocols to be followed. All changes in field sampling procedures will be documented in the field logbook and reported in the final report.

5.10 Quality Assurance Reports

A Quality Assurance Report will be issued by ERM as part of the Remedial Investigation Report. The report will include the results of the performance and document audits and any necessary corrective action procedures. In addition, a data quality assessment will be incorporated into the final report.

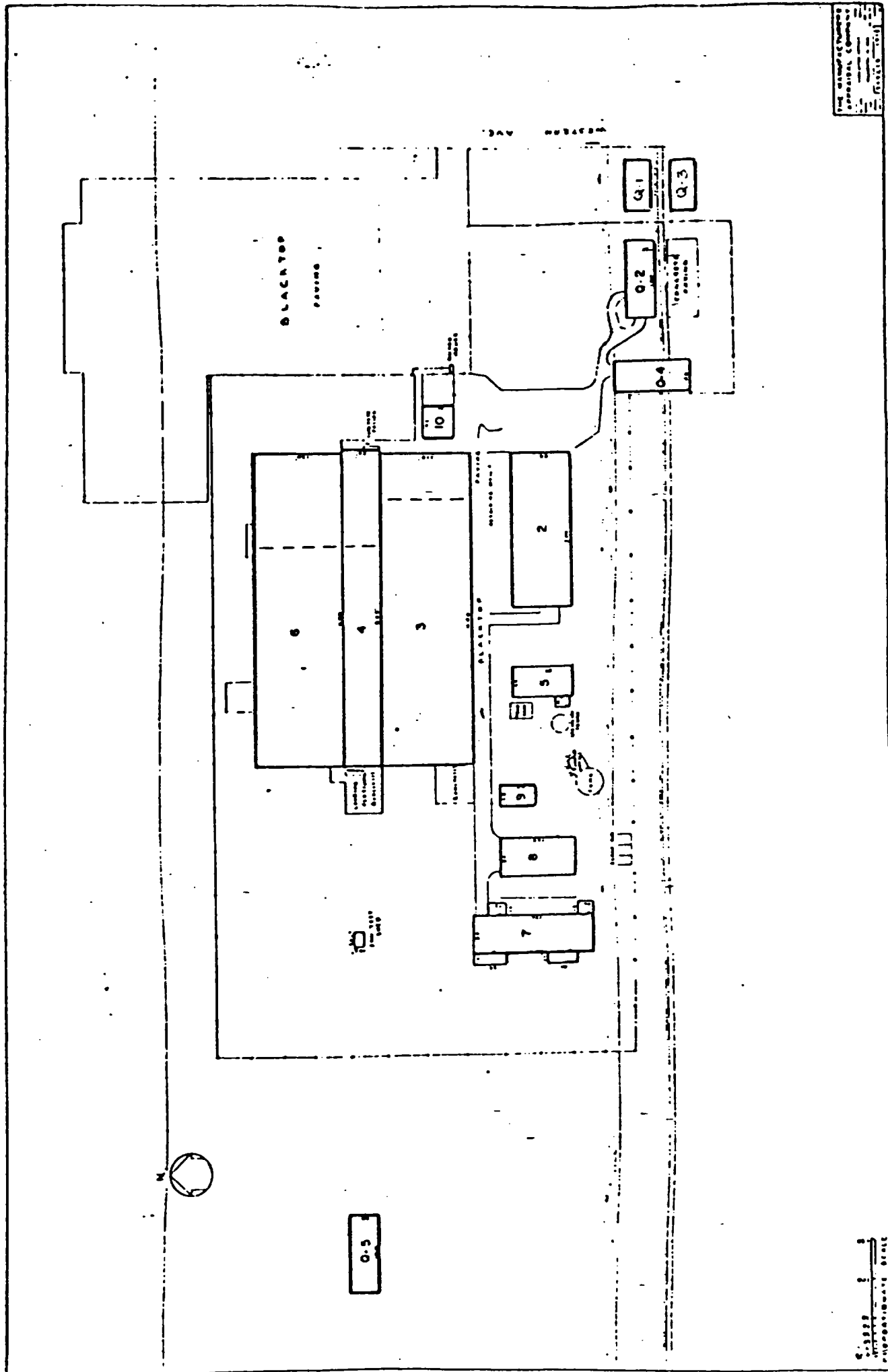
APPENDIX A
CURRENT AND PAST BUILDINGS

BUILDINGS:

	<u>ERECTED</u>	<u>DEMOLISHED</u>
Quonset Huts:		
Q-1	1946	1970 (?)
Q-2	1947 (?)	currently in use
Q-3	1946	1970 (?)
Q-4	1946	currently in use
Q-5	1947 (?)	1970 (?)

Buildings:

#2	1948	currently standing
3	1950	"
4	1957	"
5	1950	"
6	1952	"
7	1957	"
7-A	1984	"
8	1956	"
9	1955	"
10	1951	"



APPENDIX B
PLANT PRODUCTS AND LABELS

CONTINENTAL/MIDLAND
PLANT HISTORY, PRODUCTS AND LABELS

A. MALL TOOL (1947-1954)

(*Items Supplied to Government Were Under Mall Tool Label)

<u>TYPE OF TOOL</u>		<u>LABELS SUPPLIED UNDER</u>		
		<u>MALL</u>	<u>GOV'T. (*)</u>	<u>(POW'R KRAFT) WARDS</u>
1. <u>Pneumatic Tools</u>				
Screw Drivers		x		
Circular Saws		x		
Sanders		x		
Impact Wrenches		x		
Vibrator		x	x	
Hand Grinders		x		
Hand Drills (1/4"-3")		x		
Chain Saws (1P & 6P)		x	6P	
2. <u>Electric Tools</u>				
Belt Sanders		x		
Polishers (7" & 9")		x		
Door Planes		x		
Orbit Sander		x		
Circular Saw (6" - 9")		x	H-97	7 1/4"
Hand Drills (1/4"-3/4")		x	x	1/4" & 1/2"
Chain Saws (Industrial)		x		
3. <u>Flex-Shaft</u>				
Pedestal Grinders & Motors		x		
Hanger Frinders		x		
Flex-Shaft		x		
Flex-Housing		x		
Concrete Vibrators		x		
Generators		x	B-12	
Angle Spindles		x		
Straight Spindles		x		
Wheel Barrow Mountings		x		
4. <u>Railroad Equip.-Flex-Shaft Driven</u>				
Rail Slotters		x		
Rail Grinders		x		
Rail Drills		x		
Angle Spindles		x		
Straight Spindles		x		
5. <u>Miscellaneous</u>				
Gas Chain Saws		x	754	x
Power Trowels		x		
Compactors (Asphalt & Dirt)		x		
Concrete Screeds		x		

PLANT HISTORY, PRODUCTS AND LABELS

B. REMINGTON ARMS (1954-1969)

Kept company and "Mall Tool" label as is for two years and then changed their label to "Remington" and altered product lines per the following lists. Note (*) items supplied to government are now under "Remington" label.

<u>TYPE OF TOOL</u>		<u>LABELS SUPPLIED UNDER</u>		
		<u>REMINGTON</u>	<u>GOV'T. (*)</u>	<u>BELKNAP (BLUEGRASS)</u>
1. <u>Pneumatic Tools</u>				
	Chain Saws (2P & 6P)	x	6-P	
2. <u>Electric Tools</u>				
	Chain Saws (Industrial)	x		
3. <u>Flex-Shaft</u>				
	Pedestal Grinders & Motors	x		
	Hanger Grinders	x		
	Flex-Shaft	x		
	Flex-Housing	x		
	Concrete Vibrators	x		
	Generators	x	B-12	
	Angle Spindles	x		
	Straight Spindles	x		
	Wheel Barrow Mountings	x		
4. <u>Railroad Equip.-Flex-Shaft Driven</u>				
	Rail Slotters	x		
	Rail Grinders	x		
	Rail Drills	x		
	Angle Spindles	x		
	Straight Spindles	x		
5. <u>Gas Tools</u>				
	Chain Saws	1-Model	754	x
	Power Trowels	x		
	Compactors (Asphalt & Dirt)	x		
	Concrete Screeds	x		
	Rotor Tiller	x		
	Snow Blower	x		
6. <u>Powder Actuated Tools</u>				
	Stud Driver (Industrial)	x		

PLANT HISTORY, PRODUCTS AND LABELS

C. DESA INDUSTRIES (1969 to 1975)

Kept Remington label and logo for two (2) years. Then had to drop logo and change "Remington" letter styling while continuing to produce under the "Remington" label. (*) items supplied to government are supplied under the new Remington label.

TYPE OF TOOL

LABELS SUPPLIED UNDER

	REMINGTON	GOV'T. (*)	WARDS	PENNEY'S
1. <u>Pneumatic Tools</u>				
Chain Saws (1P & 6P)	x	6P		
2. <u>Electric Tools</u>				
Chain Saws (Industrial)	x			
Chain Saws (Domestic) (A)	x		x	x
(A) Also supplied under the following labels: Granja, Alko, Steinmax, Jo-Bo & Nogamatic				
3. <u>Flex Shaft</u>				
Pedestal Grinder & Motors	x			
Hanger Grinders	x			
Flex-Shaft	x			
Flex-Housing	x			
Concrete Vibrators	x			
Generators	x	B-12		
Angle Spindles	x			
Straight Spindles	x			
Wheel Barrow Mountings	x			
4. <u>Railroad Equip-Flex-Shaft Driven</u>				
Rail Slotters	x			
Rail Grinders	x			
Rail Drills	x			
Angle Spindles	x			
Straight Spindles	x			
5. <u>Gas Tools</u>	REMINGTON	CHAMPION	DESA	CRAFTSMAN
Power Trowels		x	x	
Compactors (Asphalt & Dirt)		x	x	
Concrete Screeds		x	x	
Concrete Saws		x	x	
Masonry Saws		x	x	
Mortar Mixer		x	x	
Moto-Bugs (Wheel Barrows)		x	x	
Chain Saws (B)	x	x	x	
(B) Also supplied under the following labels: Alpina, Castor, Wards, John Deere, Clinton, Nogamatic, Granja, Steinmax and Alko.				
6. <u>Powder Actuated Tools</u>				
Stud Driver (Industrial)	x			
Stud Driver (Domestic) (C)	x			x
(C) Also supplied under the "U-Haul" label				
7. <u>Miscellaneous</u>				
Log Splitter		x	x	

D. DESA/AMCA

DESA was acquired by AMCA International Corporation in 1975, continuing operations under the name and management of DESA until 1981 when AMCA's Consumer Products Division took over control of the facility under the name Continental/Midland. By that time, mid-1981, most product lines had been discontinued and the number of employees had been reduced to 35.

From that time until the present (1985) the only product line manufactured at the plant has been a line of powder actuated tools sold under the name "Remington."

APPENDIX C
PLANT PROCESSES

PROCESSES:

Processes with known beginning dates:

Chromium Plating (begun in 1946), *ended 1971*).

Magnesium Die Casting (1957).

Zinc Electroplating (1960).

Hot Black Oxide (1967)

Cold Black Oxide (1978)

Processes continuously carried on or with Indeterminate Start Up/Shut Down dates:

Copper Plating

Cutting Oils used for machining

Magnesium machining

Heat treating

Cyanide pot.

Oil Quench

Electric Motor potting material

Alkaline Cleaners

Caustic Solutions

Trichlorethylene vapor degreasing

Blue seal operation

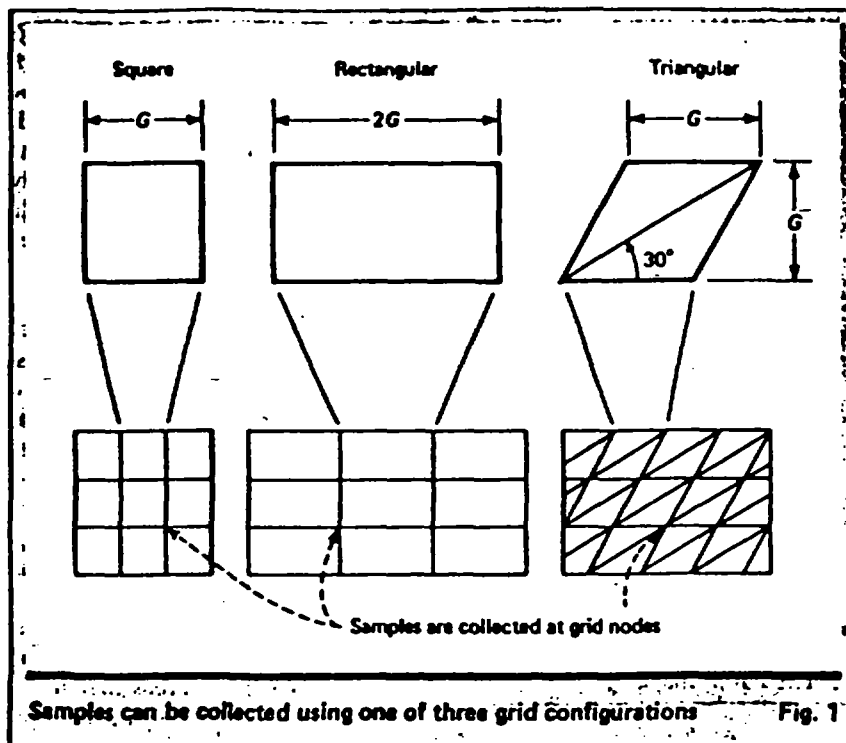
Paint stripper tank

Chrome stripping

Hot and cold glue packaging systems

Silk screening

APPENDIX D
CONTAMINANT SOURCE LOCATION TECHNIQUE



Detecting hot spots at hazardous-waste sites

Evaluating the need for remedial cleanup at a waste site involves both finding the average contaminant concentration and identifying highly contaminated areas, or "hot spots." Here is a nomographic procedure to determine the sampling configuration needed to locate a hot spot.

*John Zirschky, Clemson University, and
Richard O. Gilbert, Pacific Northwest Laboratory*

☐ This technique can be used to develop a waste-site sampling plan—to determine either the grid spacing required to detect a hot spot at a given level of confidence, or the probability of finding a hot spot of a certain size, given a particular grid spacing.

The method and an accompanying computer program (FLIPGRID) were developed for locating geologic depos-

its [1], but the basic procedure can also be used to detect hot spots at chemical- or nuclear-waste disposal sites. Nomographs based on the original program are presented for three sampling-grid configurations—square, rectangular and triangular, as shown in Fig. 1. For other configurations, FLIPGRID may be used. Ref. [2] discusses use of the nomographs when multiple hot spots may be present, and gives a method for finding the probability that a hot spot exists when none was found by sampling.

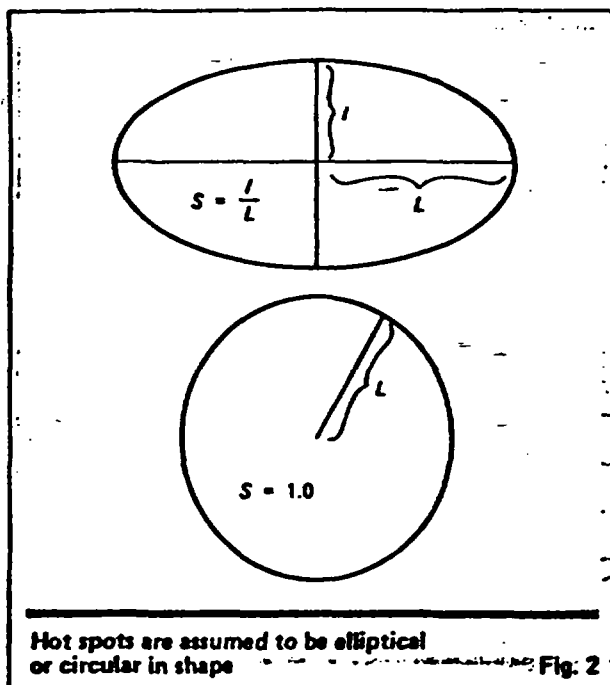
Assumptions

Several assumptions must be made in order to use this technique:

- The hot spot is circular or elliptical in shape or, if it is buried, it projects such a shape to the ground surface.
- The level of contamination that defines a hot spot is clearly specified, so as to eliminate classification errors that will change the probability of detection.
- The orientation of the hot spot with respect to the sampling grid is random. If a specific orientation is suspected, FLIPGRID may be used.
- The sampling points are small compared with the sampling area.

Key parameters

To determine the grid spacing required to locate a hot spot, the size (i.e., the minimum size area of contamina-



tion that would be of concern) and shape of the spot must be specified. The size of an elliptical target is defined by L = the length of the ellipse's semi-major axis (which is one-half its long axis); and the shape is defined by the ratio of the short axis ($2l$) to the long axis ($2L$), or

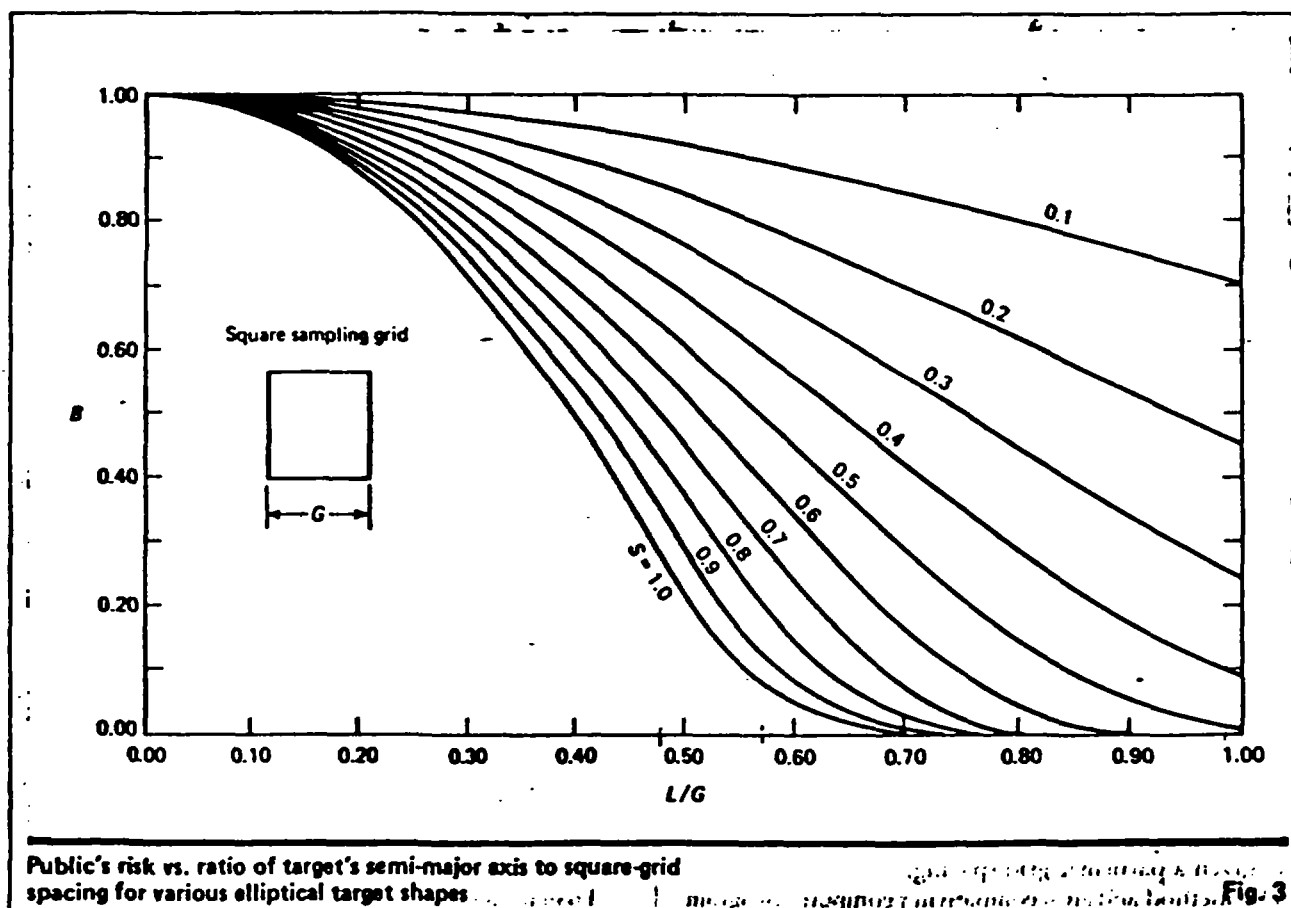
$S = l/L$ (see Fig. 2.). For a circular target, the radius would specify the size, and the shape would be 1.0. If a particular shape is not suspected, a small value for S should be used, which will result in a closer, and thus more conservative, grid spacing.

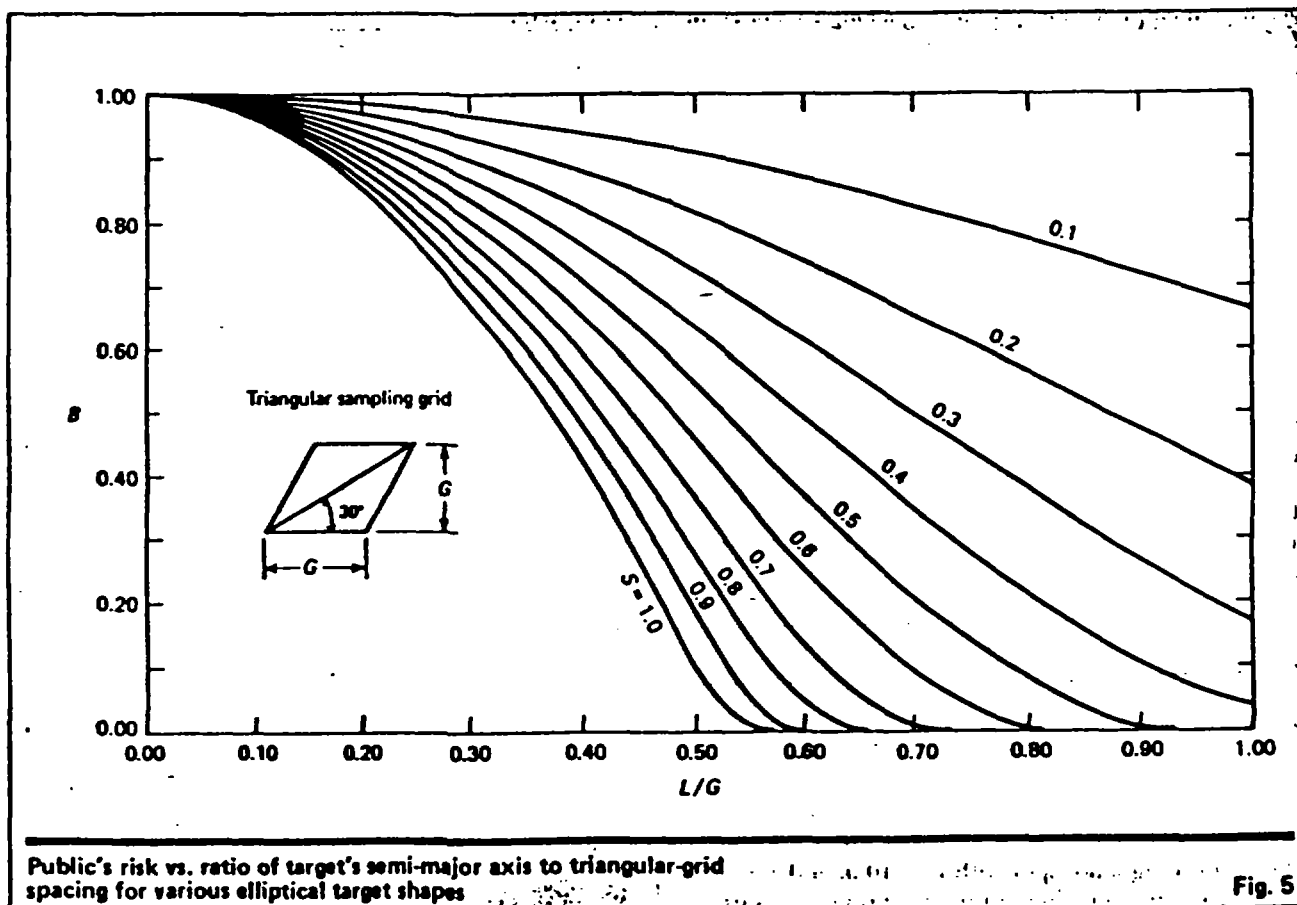
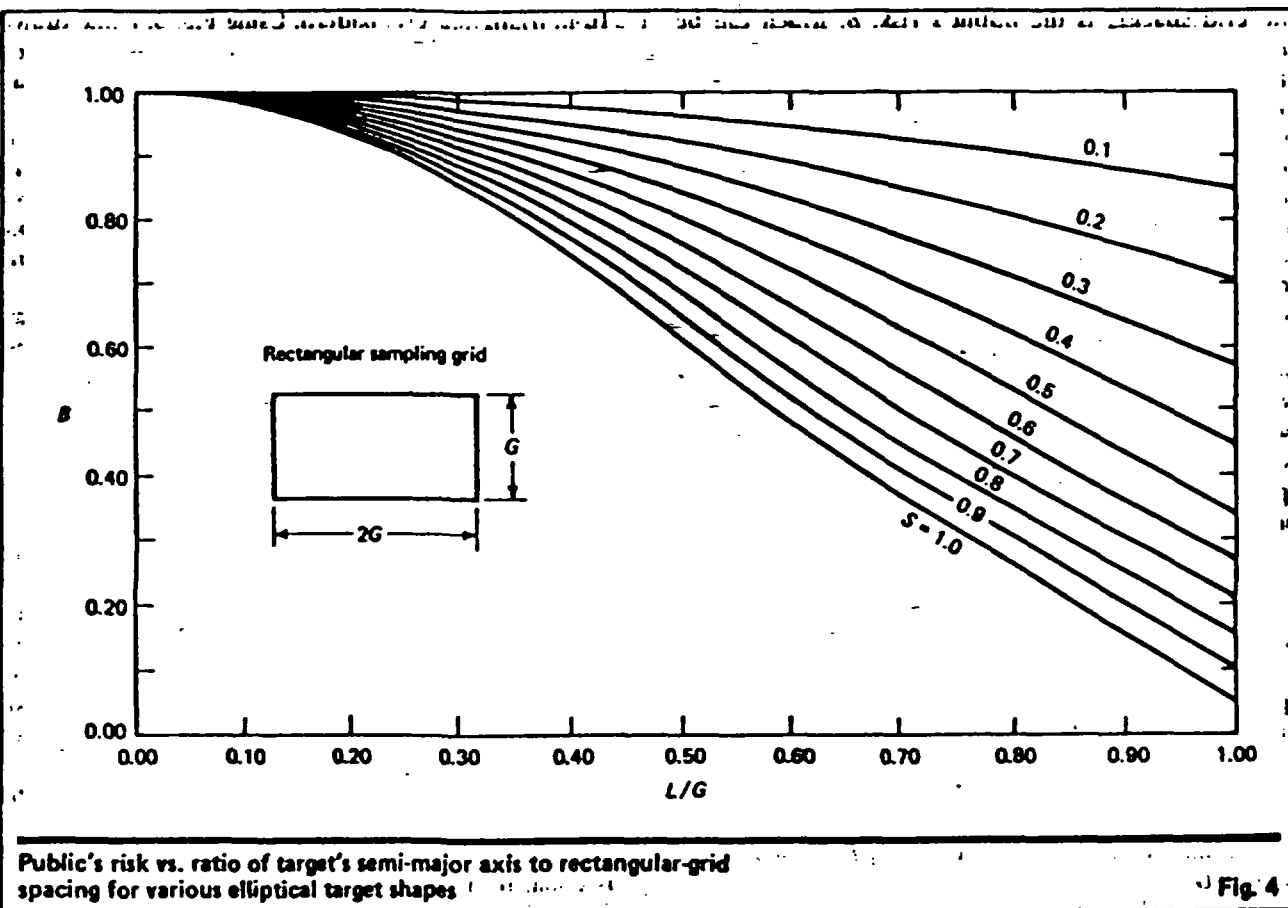
Unfortunately, there is no general analytical procedure for selecting the proper hot-spot dimensions. It depends on the situation.

For a burial trench, the limits of contamination are probably fairly well defined: historical records or interviews might indicate the size of the disposal area; plant records might show what volume of waste was generated; and local geologic conditions or construction practices might indicate the depth to which such a trench might have been excavated. Dividing the waste volume by the depth will yield an estimate of the surface area of the trench. Trench geometries can be assumed and the sampling configuration determined for each case. The smallest sampling grid should be selected.

On the other hand, if a chemical has been spilled over a large area, the overall extent of contamination may be known, but the locations of any highly contaminated areas may not be. In this case, one must consider not only the hot-spot dimensions but also the concentration of contaminant that defines a hot spot. A local regulatory agency may have to decide what concentration level and size of hot spot is hazardous; among the factors it will consider are toxicological data, the potential for public exposure, and the potential for waste migration.

The other variable that must be specified to determine





the grid spacing is the public's risk, B , which can be defined as the acceptable risk or probability of the sampling procedure missing the specified target. In other words, if one is willing to accept a 10% chance of missing a hot spot, the risk would be 0.10. This risk is often dependent on the factors listed above. For example, one might want at least a 90% probability of locating a 30-m hot spot, but might only require a 50% chance of locating a 10-m one. Since determining B is subjective, it might be better to leave this judgment to a local regulatory agency.

Finally, a grid configuration (e.g., square, rectangular or triangular) must be chosen, and doing this is somewhat arbitrary. The most conservative approach would be to compare the three patterns and select the one that would result in either (a) detection of the smallest hot spot given a certain acceptable risk, or (b) the highest probability of detecting a hot spot of a given size.

Using the nomographs

Fig. 3-5 can be used in several ways, depending on which parameters are known.

Case 1—If L , S and B have been specified, the grid spacing, G , can be determined. First, draw a horizontal line from B (on the vertical axis) to the curve representing the appropriate target shape, S . From that point, draw a vertical line down to the horizontal axis to find the ratio of the target size to the grid spacing, L/G . Then, since L has been specified, G is simply L divided by the ratio L/G .

For example, suppose you want to determine the square-grid spacing required to have a 90% chance of locating an elliptical hot spot having a long axis of 20 m ($L = 10$ m) and a shape of 0.6. The public's risk would be $B = 1.0 - 0.90 = 0.10$. On Fig. 3, the intersection of $B = 0.10$ and the curve for $S = 0.6$ corresponds to an L/G ratio of 0.75. Thus, $G = 10/0.75 = 13.3$ m.

Case 2—Conversely, if a grid spacing has already been selected, the size of the hot spot (of a given shape) likely to be detected can be determined. Here, B , S and G are the known parameters. L/G is found in the same manner as described above; then, to calculate L , L/G is multiplied by G .

For instance, assume that a rectangular pattern has been chosen and that samples can only be collected every 20 m in one direction and every 40 m in the other. If the target hot spot has a shape of 1.0, and the acceptable public's risk is 0.20, then, from Fig. 4, L/G would be 0.86. Solving for L yields a hot-spot size of $L = 20(0.86) = 17.2$ m. Thus, there would be an 80% chance of locating a circular 17.2-m-radius hot spot, using a rectangular sampling grid with a 20-m \times 40-m spacing.

Case 3—A proposed survey plan can be analyzed to determine the probability of detecting a hot spot of a given size and shape, simply by reversing the steps described above. Since L and G are known, calculate L/G . Draw a vertical line from that value on the horizontal axis up to the curve representing the appropriate shape, S . From that point, draw a horizontal line to the B axis to find the public's risk.

As an example, suppose you want to know the probability of locating a hot spot with $L = 10$ m and $S = 0.3$, given that your sampling contractor proposes to use a

10-m triangular-grid pattern. Using Fig. 5, a line drawn from $L/G = 1.0$ to the curve for $S = 0.3$ and then extended to the left yields $B = 0.18$. Thus, there is an 82% chance that the target will be found.

Case 4—But what if sampling with grid spacing G found no hot spots of the size (or larger) and shape of concern, given that p is the *a priori* probability that such a hot spot exists (specified before sampling)? The probability that such a hot spot exists, even though sampling did not find it, is $p_a = Bp/(Bp + 1 - p)$ [2].

For instance, if $L = 10$ m, $B = 0.1$, $S = 1$, and a square grid is to be used, Fig. 3 gives $G = 17.9$ m. If the best pre-sampling guess for p was 0.25, then $p_a = 0.1(0.25) / [0.1(0.25) + 1 - 0.25] = 0.032$.

Application

A typical application of this procedure might be as follows:

Chemical wastes are known to have been disposed of in an area measuring 100 m \times 100 m. From interviews with employees, plant officials have learned that the wastes were buried in a trench roughly 20 m long by 12 m wide, but the exact location of the trench is not known. Soil samples will be collected using a square-grid pattern, and plant officials would like at least a 95% chance of finding the trench.

In this case, the hot spot (i.e., the trench) could be approximated by an ellipse with a shape of $S = 12/20 = 0.6$, and a length of $L = 20/2 = 10$ m. From Fig. 3, L/G is equal to about 0.80. Thus, $G = 10/0.8 = 12.5$ m. Given this grid spacing and the dimensions of the field (100 m \times 100 m), a total of 64 samples would have to be collected.

Cynthia Fabian Mascone, Editor

References

1. Singer, D. A., "ELJPCRID, A Fortran IV Program for Calculating the Probability of Success in Locating Elliptical Targets with Square, Rectangular, and Hexagonal Grids," *Geocom Bulletin*, Vol. 5, No. 5-6, May-June 1972, pp. 111-126.
2. Gilbert, R. O., "Some Statistical Aspects of Finding Hot Spots and Buried Radioactivity," TRAN-S'AT: Statistics for Environmental Studies, No. 19, PNL-SA-10274, Battelle Memorial Institute, Pacific Northwest Laboratory, available from National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

The authors

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Richard O. Gilbert is a statistician and the coordinator of environmental sampling and analysis in the Energy Systems Dept., Pacific Northwest Laboratory, Richland, WA 99352; Tel: (509) 376-4218. He holds an M.S. in Statistics from Kansas State U. and a Ph.D. in Biomathematics from the U. of Washington. His expertise is in the development and application of statistical design and analysis methods for environmental studies. He belongs to the American Statistical Assn., the Biometrics Soc., and Sigma Xi, The Scientific Research Soc.

APPENDIX E
ROCKY MOUNTAIN QUALITY ASSURANCE PLAN

INTRODUCTION

Background

Rocky Mountain Analytical Laboratory provides analytical and consulting services to industry, government, and other private laboratories. Projects in the environmental, energy, forensic, occupational health, and product safety fields are commonly supported. The services RMA provides covers the full range of classical and modern analytical chemistry techniques and instrumental analysis.

Nearly all regulatory agencies have requirements or recommendations for quality assurance procedures. The decisions made by the regulators and regulated are too important and costly to be made based on inaccurate or misleading data. Fields such as synfuel development, in which the analytical work is not regulatory based, also cannot tolerate inaccurate or misleading data.

Purpose of the Document

This document describes the RMA Quality Assurance Plan. The plan is designed to define quality assurance goals and methods for attaining these goals. Basic and general policies, objectives, organizational responsibilities, and procedures are given in this document. Standard and specific operational, quality control, and methodology procedures are described in other RMA manuals.

Many times a specific project plan must be developed for a project because of its complexity or uniqueness.

Company Objective

The goal of Rocky Mountain Analytical Laboratory is to provide data that has a defined quality, and which is adequate to meet the client's objective in a reasonable time-frame and at a fair price.

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2.0 Quality Assurance Management

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- 2.2 Quality Assurance Officer**
- 2.3 Section Managers**
- 2.4 Technical Staff**

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- 3.1 Company Management**
- 3.2 Quality Assurance Staff**
- 3.3 Section Managers**
- 3.4 Technical Staff**

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- 4.1 Facilities and Instrumentation**
- 4.2 Consumables**
- 4.3 Services**

5.0 Data Generation

- 5.1 Standard Operating Procedures**
- 5.2 QA Project Plans**

6.0 Data Processing

- 6.1 Collection**
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- 6.3 Data Reduction and Analysis**
- 6.4 Data Storage and Transfer**

7.0 Data Quality Assessment

- 7.1 Precision and Representativeness**
- 7.2 Accuracy**
- 7.3 Comparability and Completeness**

8.0 Corrective Action

9.0 Implementation

1.0 QUALITY ASSURANCE POLICY STATEMENT

It is the policy of Rocky Mountain Analytical Laboratory (RMA) that the quality assurance and quality control program is adequate to assure that all data collected are of known and documented quality. The QA requirements apply to all data reported by RMA whether generated internally or by subcontractors.

The President of RMA has the responsibility for assuring that the QA plan is implemented. The senior staff member in each technical area is responsible for establishing the procedures that will result in quality data. An independent quality assurance staff office has the responsibility for assuring that company QA policy is followed.

The objective of the QA plan is to ensure, assess, and document that all data generated and reported are scientifically valid, legally defensible, and are of known accuracy, precision, representativeness, and comparability.

All data generated by RMA or one of its subcontractors must meet the following criteria:

- a. Analytical methods and procedures conform to the requirements of the appropriate regulatory agency, such as EPA, OSHA, FDA, insofar as possible. Where no regulatory method exists, standard methods, such as ASTM, AOAC, AWWA, are followed, insofar as possible. All methods are fully documented and include integral quality control procedures.
- b. Standard operating procedures and protocols and quality assurance project plans are developed and implemented before data collection begins.
- c. The intended use of the data and the associated acceptance criteria for data quality are defined before a project begins. Methods are selected based on these considerations.
- d. All reported data are at a quality level adequate for the intended use of the data. Acceptable and contraindicated uses of the data are stated in each report.
- e. When possible, precision, accuracy, representativeness, and comparability of reported data is stated.
- f. Data processing procedures are documented and quality control criteria established for each measurement or project. All data are reviewed relative to these criteria. Corrective actions are taken and samples re-analyzed when data do not meet the established criteria.

The QA Plan is evaluated at least annually and revised as required.

2.0 QUALITY ASSURANCE MANAGEMENT

- 2.1 RMA President** - The President of the company has responsibility for all laboratory activities, including quality assurance.
- 2.2 Quality Assurance Officer** - The QA office reports directly to the company President. The primary responsibility of the office is to independently audit the adherence of laboratory staff to company QA policy. The responsibility includes the periodic introduction of performance evaluation samples into the analysis of samples for on-going projects, the evaluation of quality control data to assure that established procedures and criteria are being followed, and the recommendation of methods to improve the RMA QA program.
- 2.3 Section Managers** - The senior technical manager in each section is responsible for the technical quality of all data and reports from that section. The responsibilities include: junior staff training and supervision; method development, selection, and documentation; development and documentation of quality control procedures and criteria for data quality; data evaluation and report preparation.
- 2.4 Technical Staff** - Every technical staff member must be knowledgeable about and understand the RMA QA program in order for it to be successful. The staff member who has generated a piece of data, obviously affects the data quality the most. In addition, this person is the most familiar with how the data was generated and is in a critical position to help evaluate the quality of the data.

3.0 PERSONNEL QUALIFICATIONS

- 3.1 Company Management** - The management must have sufficient understand of the technical aspects of the projects and analytical techniques to be able to balance the input of personnel and equipment resources with the expected data quality output.
- 3.2 Quality Assurance Staff** - The responsibility of the quality assurance office is structured so that the primary prerequisite for staff is a good background in statistics, mathematics, and auditing.
- 3.3 Section Managers** - All section managers must have sufficient knowledge and experience, both in their field of technical expertise and in QA, to assure and document the quality of the project data. A project is not initiated until the section manager has documented the analytical approach and supervised the collection of data to validate the ability of the organization to produce quality data.

- 3.4 Technical Staff - All technical staff must have adequate training before being expected to produce project data. Each staff member goes through a validation process in which the data produced must meet acceptable criteria before the staff member is allowed to independently generate data.

4.0 FACILITIES, EQUIPMENT, CONSUMABLES, AND SERVICES

The requirements for facilities, instrumentation, consumables, and services are determined by the type of analyses made and the objectives of each project. Each section manager is responsible for assuring that the facilities, instrumentation, supplies, and services are adequate to produce data of the desired quality.

The specific laboratory facilities, instrumentation, supplies, and services required for each analysis or project are defined in the appropriate written RMA method. The following general guidelines form the basis for the specifications listed in each RMA method.

- 4.1 Facilities and Instrumentation - All facilities must be adequate to produce quality data with minimum risk to laboratory staff. The suitability of the facility with respect to size, lighting, ventilation, and environmental conditions is the responsibility of the RMA president and section managers. Safety and health features are very important. No work is undertaken unless it can be performed safely with the available facility equipment. In addition, all personnel exposed to toxic carcinogenic or other hazardous materials are provided the opportunity for health monitoring services on an annual basis.

General utility services and laboratory instrumentation must be present and adequate to produce data of acceptable quality. All instrumentation is evaluated before being placed into service to assure that performance specifications are met.

All instrumentation is inspected routinely and appropriate preventive maintenance performed. Maintenance is performed by qualified personnel, whether RMA staff or contract organizations. All maintenance is documented for each instrument. The maintenance log includes the date and type of service performed.

- 4.2 Consumables - A general RMA procedure is written covering the quality criteria for reagents, standards, and supplies. Most methods also include specific acceptance criteria. The general criteria is that the consumable correspond to its label specifications and that its quality is consistent with the materials' intended use. Standards are compared with other commercial sources and past standards. Reagents are checked for performance and absence of unwanted contamination. Supplies are evaluated for performance and absence of contamination.

In addition, recertification is performed routinely to characterize changes in concentration, formation of new chemical species, or loss of original chemical species to prevent them from degrading data quality. Where possible, the integrity of the substance is checked prior to each use. A permanent written record is made of all certification procedures and users, including names, dates of certification, and use.

- 4.3 Services - The reliability and quality of all services (e.g., analytical services, audit services, and instrument maintenance) provided is assessed both prior to and during use, both in terms of personnel and service provided.

5.0 DATA GENERATION

Field, laboratory, and engineering activities all affect data quality. RMA usually only directly affects the laboratory component. However, the field and engineering components are affected as much as possible through written and verbal guidance. Good Laboratory Practices (GLP) are established by Standard Operating Procedures (SOP) and in some cases by QA project plans for unique or complex projects. GLPs and SOPs are developed and implemented so that all data generated and reported are scientifically valid, legally defensible, of known accuracy and precision, representativeness, and comparability.

- 5.1 Standard Operating Procedures - Many laboratory procedures are the same and common to a wide diversity of projects. These routine methods are written in detail describing who does what, when, where, how, and why in a clear, stepwise manner. Standard operating procedures are prepared for the following activities:

- a. Sample collection, preservation, and shipment.
- b. Sample custody, receipt, and tracking.
- c. Document control.
- d. Chemical receipt and storage and analytical reference standards preparation and validation.
- e. Instrument calibration, maintenance, and repair.
- f. Analytical methodology.
- g. Quality control and data analysis.
- h. Guidelines for method development and validation.
- i. Safety.

The standard operating procedures are defined so that they are:

- a. Adequate to establish traceability of standards, instrumentation, samples, and data.
- b. Simple, so a user with basic technical education, experience, and training can use them properly.
- c. Complete enough so the user/reader can follow the directions in a stepwise manner through the sampling, analysis, and data-handling.
- d. Consistent with sound scientific principles.
- e. Consistent with current regulatory agency requirements and guidelines, including the "Good Laboratory Practices" documents.
- f. Consistent with the instrument manufacturer's specific instruction manuals.

The standard operating procedures provide for documentation sufficiently complete to:

- a. Thoroughly document all activities related to the collection and reporting of data to assure the scientific validity of the results.
- b. Thoroughly document all activities related to the collection and reporting of data to assure that the results are legally defensible.

Deviation from standard operating procedures are documented and justified. The SOPs are updated as needed.

5.2 QA Project Plans - The activities required to support a complex or unique project may not be adequately defined in the standard operating procedures. Specific written QA project plans are required for these projects. The senior technical manager in the area involved writes up the project plan. The project plan addresses the following topics as necessary:

- a. Title page with space for approval signatures.
- b. Table of contents.
- c. Project description including the intended and contraindicated uses of the data.
- d. Project organization, technical approach, and responsibilities.
- e. Data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability.
- f. Personnel, facilities, supplies, and equipment required.
- g. Sample collection, custody, and logging procedures.
- h. Document control procedures.
- i. Instrument operation, standardization and maintenance procedures.
- j. Analysis and quality control procedures.

k. Data processing, analysis, and validation methods.

l. Performance audits, feedback, and corrective action protocols.

Each QA project plan is reviewed internally and with the client before work is initiated.

6.0 DATA PROCESSING

Data processing encompasses all manipulations performed on raw information to change its form of expression, its location, its quantity, or its dimensionality. This includes data collection, validation, storage, transfer, reduction, and analysis.

6.1 Collection - The Standard Operating Procedures and QA Project Plans address both manually collected and computerized data acquisition systems. The internal checks used to ensure suitable quality in the data collection process are identified. Validation of raw data is also addressed.

6.2 Validation - Data validation is defined as the process whereby data are analyzed and accepted or rejected based on a set of scientifically acceptable criteria. The Standard Operating Procedures and analytical methods describe how a reduced data set is generated, including a clearly defined audit trail that can be retraced datum by datum. The validation process includes many forms of manual and computerized checks using specified criteria. The final step in evaluation of data is performed by a trained professional. This is often the most important step because of the complexity of most projects.

6.3 Data Reduction and Analysis - Data reduction is performed according to standard operating procedures. Data analysis is performed to meet the objectives of each project plan. The procedures used to analyze the data are described in the analytical methods and standard operating procedures.

6.4 Data Storage and Transfer - Data storage involves keeping the data so that they are not degraded or disclosed to unauthorized personnel. At every stage of data processing, the data are "backed-up" on tape or in hard copy. Access to data is restricted to authorized personnel. The facility always remains locked. In addition, highly confidential samples and data are further stored in locked cabinets. Data is transferred by means that are specified by the project client.

7.0 DATA QUALITY ASSESSMENT

The quality of all data generated and processed is assessed for precision, accuracy, representativeness, comparability, and completeness. The evaluation procedures are defined in standard operating procedures and project plans. The following aspects are addressed:

- 7.1 Precision and Representativeness - Precision and representativeness are assessed by collecting duplicate samples and analyzing duplicate samples. Collection, preparation, and analysis procedures are sometimes evaluated separately depending on the objective of the project.
- 7.2 Accuracy - Accuracy is evaluated by comparing determined results to true or known values of standard samples. Detection limits are determined on the entire method by analyzing blanks. Calibration of methods and instruments is referenced to traceable standards. Analysis of spike and control standards are also used to evaluate data accuracy.
- 7.3 Comparability and Completeness - Data comparability is usually assured by the use of standard and official methodologies. Data completeness is accomplished by comparison of the project objectives and required outputs as compared to the final report.

8.0 CORRECTIVE ACTION

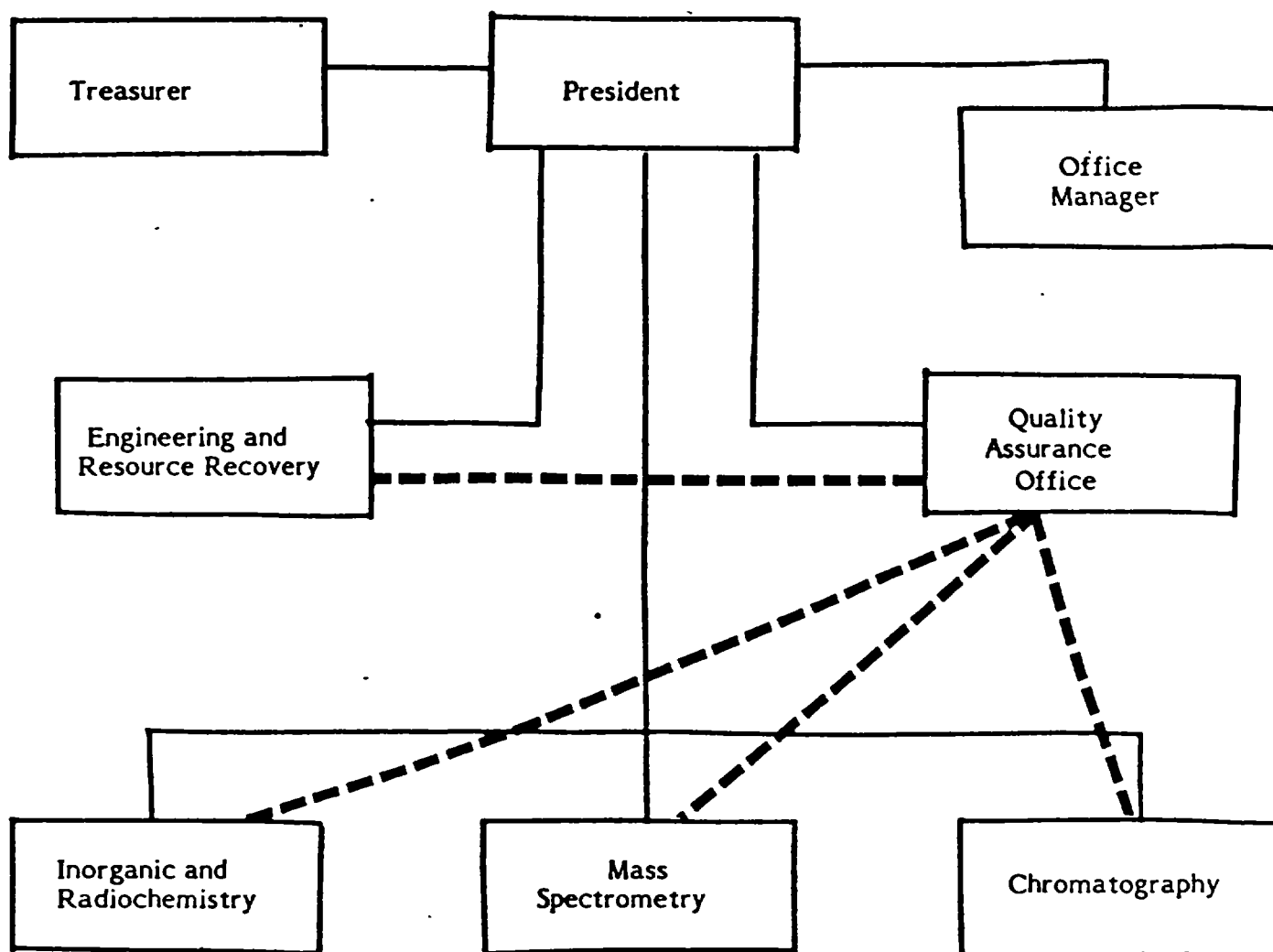
The reporting of quality data is dependent upon timely data evaluation followed by corrective actions and then re-analysis. The means of correcting problems is highly dependent on the nature of the problem. Specific methods and standard operating procedures describe many typical corrective techniques. However, many problems require a professional evaluation and a unique solution to solve.

The basis for taking corrective action is established criteria. The on-site analyst and senior staff person, in that order, are required to evaluate the data, determine if a problem exists, devise a solution, and take a corrective action that leads to valid data.

9.0 IMPLEMENTATION

This plan, RMA Standard Operating Procedures, and written analytical methods describes a program that is in full operation.

FIGURE 1. RMA ORGANIZATION

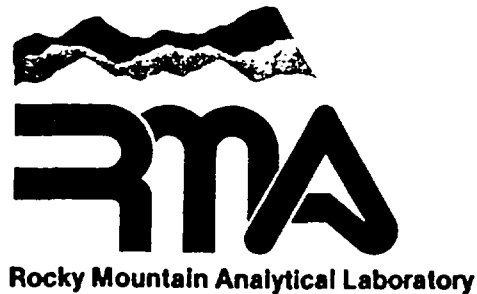


———— Line of Management

----- QA Evaluation Function

APPENDIX B

**PHASE I LABORATORY REPORTS
ROCKY MOUNTAIN ANALYTICAL LABORATORY**



February 14, 1985

Frank Blaha
ERM North Central
635 Sterling Avenue
Palatine, Illinois 60067

Dear Frank:

Enclosed are the analytical results for the three samples received at RMAL on January 22, 1985. The samples were analyzed by standard EPA methods promulgated in 40 CFR 136 as follows:

ICP metals - EPA Method 200.7
Volatile organics - EPA Method 624
PCBs - EPA Method 608

Please call if you have any questions concerning these results.

Best regards,

Jerry L. Parr
Director
Quality Assurance

JLP/lk

Enclosures

RMAL #4625

SAMPLE DESCRIPTION INFORMATION

for

ERM-North Central

<u>RMA Sample No.</u>	<u>Sample Description</u>	<u>Sample Type</u>	<u>Date Sampled</u>	<u>Date Received</u>
4625-01	Sample No. 1 North Pump	Water	1/20/85	1/22/85
4625-02	Sample No. 2 South Pump	Water	1/20/85	1/22/85
4625-03	Sample No. 3 Stream	Water	1/20/85	1/22/85

February 14, 1985

ANALYTICAL RESULTS FOR TOTAL METALS BY ICP

ERM-North Central

Parameter	Detection			
	Units	Limit	4625-01	4625-02 4625-03
Aluminum	mg/l	0.05	ND	ND 0.06
Antimony	mg/l	0.09	ND	ND ND
Arsenic	mg/l	0.05	ND	ND ND
Barium	mg/l	0.005	0.046	0.044 0.065
Beryllium	mg/l	0.001	ND	ND ND
Boron	mg/l	0.01	0.68	0.67 0.61
Cadmium	mg/l	0.006	ND	ND ND
Calcium	mg/l	0.1	140	130 130
Chromium	mg/l	0.005	ND	ND ND
Cobalt	mg/l	0.006	ND	ND ND
Copper	mg/l	0.008	0.012	ND ND
Iron	mg/l	0.07	0.14	ND 0.13
Lead	mg/l	0.05	ND	ND ND
Magnesium	mg/l	0.2	69	68 63
Manganese	mg/l	0.005	0.012	0.007 0.035
Molybdenum	mg/l	0.005	0.020	0.016 0.021
Nickel	mg/l	0.01	ND	ND ND
Phosphorus	mg/l	0.4	ND	ND ND
Potassium	mg/l	0.3	7.8	6.8 6.7
Selenium	mg/l	0.4	ND	ND ND
Silica	mg/l	0.3	10	9.7 9.6
Silver	mg/l	0.004	ND	ND ND
Sodium	mg/l	5.0	21	20 19
Strontium	mg/l	0.005	1.1	1.1 1.0
Tin	mg/l	0.03	ND	ND ND
Titanium	mg/l	0.02	ND	ND ND
Vanadium	mg/l	0.004	ND	ND ND
Zinc	mg/l	0.02	0.27	0.67 1.3

ND = Not detected. NR = Not requested.

ANALYTICAL RESULTS FOR VOLATILE ORGANICS

ERM-North Central

Parameter	Detection		4625-01	4625-02
	Units	Limit		
1V Acrolein	ug/l	100	BDL	BDL
2V Acrylonitrile	ug/l	100	BDL	BDL
3V Benzene	ug/l	5	BDL	BDL
4V Bis(chloromethyl)ether	ug/l	5	BDL	BDL
5V Bromoform	ug/l	5	BDL	BDL
6V Carbon tetrachloride	ug/l	5	BDL	BDL
7V Chlorobenzene	ug/l	5	BDL	BDL
8V Chlorodibromomethane	ug/l	5	BDL	BDL
9V Chloroethane	ug/l	10	BDL	BDL
10V 2-Chloroethylvinyl ether	ug/l	5	BDL	BDL
11V Chloroform	ug/l	5	BDL	BDL
12V Dichlorobromomethane	ug/l	5	BDL	BDL
13V Dichlorodifluoromethane	ug/l	10	BDL	BDL
14V 1,1-Dichloroethane	ug/l	5	BDL	BDL
15V 1,2-Dichloroethane	ug/l	5	BDL	BDL
16V 1,1-Dichloroethylene	ug/l	5	BDL	BDL
17V 1,2-Dichloropropane	ug/l	5	BDL	BDL
18V 1,3-Dichloropropylene	ug/l	5	BDL	BDL
19V Ethylbenzene	ug/l	5	BDL	BDL
20V Methylbromide	ug/l	10	BDL	BDL
21V Methylchloride	ug/l	10	BDL	BDL
22V Methylene chloride	ug/l	10	BDL	BDL
23V 1,1,2,2-Tetrachloroethane	ug/l	5	BDL	BDL
24V Tetrachloroethylene	ug/l	5	BDL	BDL
25V Toluene	ug/l	5	BDL	BDL
26V 1,2-trans-Dichloroethylene	ug/l	5	BDL	BDL
27V 1,1,1-Trichloroethane	ug/l	5	BDL	BDL
28V 1,1,2-Trichloroethane	ug/l	5	BDL	BDL
29V Trichloroethylene	ug/l	5	BDL	BDL
30V Trichlorofluoromethane	ug/l	10	BDL	BDL
31V Vinyl chloride	ug/l	10	BDL	BDL

ND = Not detected. NR = Not requested.
BDL = Below detection limit.

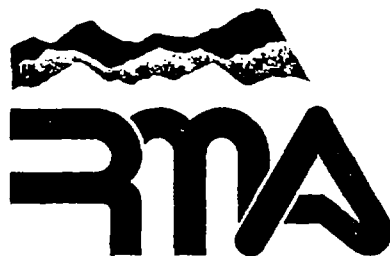
ANALYTICAL RESULTS FOR PCBs

ERM-North Central

Parameter	Detection			
	Units	Limit	4625-01	4625-02 4625-03*
PCB's				
Aroclor 1016	mg/l	0.0008	ND	ND ND
Aroclor 1221	mg/l	0.002	ND	ND ND
Aroclor 1232	mg/l	0.002	ND	ND ND
Aroclor 1242	mg/l	0.001	ND	ND ND
Aroclor 1248	mg/l	0.001	ND	ND 0.001
Aroclor 1254	mg/l	0.0005	ND	ND ND
Aroclor 1260	mg/l	0.0005	ND	ND ND

ND = Not detected. NR = Not requested.

*Detection limits are 1/2 x those listed due to an extra column-cleanup and concentration step performed on the sample.



Rocky Mountain Analytical Laboratory

August 22, 1985

Frank Blaha
ERM - North Central, Inc.
835 Sterling Avenue
Palatine, Illinois 60067

Dear Mr. Blaha:

The 34 soils and 6 waters received June 19-21, 1985 have been analyzed. The results are enclosed. We hope the slight delay in reporting the data hasn't caused any inconvenience.

Due to the toxic nature of some of the soils, we would like to ship the unused samples back to you (after any further analyses). This would avoid our having to charge extra for sample disposal. A reply to this query would be appreciated.

Please call with any questions.

Best Regards,

Karen M. Shreve
Chemist II
Chromatography Division

Approved By:

Michael P. Phillips, Ph.D.
Manager
Organic Mass Spectrometry Division

KMS/MPP:emf
Enclosures

RMAL #51050